

FINANCIAL POLICY AND CORPORATE STRATEGY

BASIC CONCEPTS AND FORMULAE

1. Strategic Management Decision Making Frame Work

Strategic management is a systems approach, which is concerned with where the organization wants to reach and how the organization proposes to reach that position. It intends to run an organization in a systematised fashion by developing a series of plans and policies known as strategic plans, functional policies, structural plans and operational plans.

2. Strategy at Different Levels

Strategies at different levels are the outcomes of different planning needs.

- **Corporate Strategy:** At the corporate level planners decide about the objective or objectives of the firm along with their priorities. A corporate strategy provides with a framework for attaining the corporate objectives under values and resource constraints, and internal and external realities.
- **Business Strategy:** It is the managerial plan for achieving the goal of the business unit. However, it should be consistent with the corporate strategy of the firm and should be drawn within the framework provided by the corporate planners.
- **Functional Strategy:** It is the lowest level plan to carry out principal activities of a business. Functional strategy must be consistent with the business strategy, which in turn must be consistent with the corporate strategy.

3. Basic Issues Addressed Under Financial Planning

Financial planning is the backbone of the business planning and corporate planning. It helps in defining the feasible area of operation for all types of activities and thereby defines the overall planning framework. Outcomes of the financial planning are the financial objectives, financial decision-making and financial measures for the evaluation of the corporate performance.

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- **Profit Maximization versus Wealth Maximization:** Profit may be an important consideration for businesses but not its maximization because profit maximization as a financial objective suffers from multiple limitations. Wealth maximisation, on the other hand, is measured in terms of its net present value to take care of both risk and time factors. Wealth ensures financial strength of the firm, long term solvency and viability. It can be used, as a decision criterion in a precisely defined manner and can reflect the business efficiency without any scope for ambiguity.
- **Cash Flow:** It deals with the movement of cash and as a matter of conventions, refers to surplus of internally generated funds over expenditures.
- **Credit Position:** It describes its strength in mobilizing borrowed money. In case the internal generation of cash position is weak, the firm may exploit its strong credit position to go ahead in the expansion of its activities.
- **Liquidity Position of the Business:** It describes the extent of idle working capital. It measures the ability of the firm in handling unforeseen contingencies.

4. Interface of Financial Policy and Strategic Management

Financial policy of a company cannot be worked out in isolation of other functional policies. It has a wider appeal and closer link with the overall organizational performance and direction of growth.

- Sources of finance and capital structure are the most important dimensions of a strategic plan. The need for fund mobilization to support the expansion activity of firm is utmost important for any business.
- Policy makers should decide on the capital structure to indicate the desired mix of equity capital and debt capital.
- Another important dimension of strategic management and financial policy interface is the investment and fund allocation decisions.
- Dividend policy is yet another area for making financial policy decisions affecting the strategic performance of the company. A close interface is needed to frame the policy to be beneficial for all.

5. Balancing Financial Goals Vis-À-Vis Sustainable Growth

Sustainability means development of the capability for replicating one's activity on a sustainable basis. The weak concept of sustainability requires that the overall stock of capital assets should remain constant. It refers to preservation of critical

resources to ensure support for all, over a long time horizon. The strong version is concerned with the preservation of resources under the primacy of ecosystem functioning. In terms of economic dimension, sustainable development rejects the idea that the logistic system of a firm should be knowingly designed to satisfy the unlimited wants of the economic person. A firm has to think more about the collective needs and less about the personal needs. This calls for taking initiatives to modify, to some extent, the human behaviour. The other economics dimension of sustainability is to decouple the growth in output of firm from the environmental impacts of the same.

6. Principles of Valuation

Choice of the degree of sustainability approach for sustainability and modification in the sustainability principle must be based on financial evaluation of the alternative schemes in terms of financial and overall corporate objectives.

- **Valuation Method:** This method depends on demand curve approach by either making use of expressed preferences or making use of revealed preferences.
- **Pricing Method:** This method is a non-demand curve approach that takes into consideration either opportunity costs or alternative costs or shadow projects or government payments or those response methods depending on the nature of the problem and environmental situation.

Valuation methods are in general more complex in implementation than pricing methods. But demand curve methods are more useful for cases where it seems likely that disparity between price and value is high.

Question 1

Discuss the importance of strategic management in today's scenario?

Answer

Importance of Strategic Management

Strategic management intends to run an organization in a systematized fashion by developing a series of plans and policies known as strategic plans, functional policies, structural plans and operational plans. It is a systems approach, which is concerned with where the organization wants to reach and how the organization proposes to reach that position. Thus, strategic management is basically concerned with the futurity of the current decisions without ignoring the fact that uncertainty in the system is to be reduced, to the extent possible, through continuous review of the whole planning and implementation process. It is therefore necessary for an organization interested in long

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run survival and command over the market, to go for strategic planning and the planning process must be holistic, periodic, futuristic, intellectual and creative with emphasis given on critical resources of the firm otherwise, the organization will fall in the traps of tunneled and myopic vision.

Question 2

Explain the different levels of strategy.

Answer

Strategies at different levels are the outcomes of different planning needs. There are basically three types of strategies:

- (a) **Corporate Strategy:** At the corporate level planners decide about the objective or objectives of the firm along with their priorities and based on objectives, decisions are taken on participation of the firm in different product fields. Basically a corporate strategy provides with a framework for attaining the corporate objectives under values and resource constraints, and internal and external realities. It is the corporate strategy that describes the interest in and competitive emphasis to be given to different businesses of the firm. It indicates the overall planning mode and propensity to take risk in the face of environmental uncertainties.
- (b) **Business Strategy:** It is the managerial plan for achieving the goal of the business unit. However, it should be consistent with the corporate strategy of the firm and should be drawn within the framework provided by the corporate planners. Given the overall competitive emphasis, business strategy specifies the product market power i.e. the way of competing in that particular business activity. It also addresses coordination and alignment issues covering internal functional activities. The two most important internal aspects of a business strategy are the identification of critical resources and the development of distinctive competence for translation into competitive advantage.
- (c) **Functional Strategy:** It is the low level plan to carry out principal activities of a business. In this sense, functional strategy must be consistent with the business strategy, which in turn must be consistent with the corporate strategy. Thus strategic plans come down in a cascade fashion from the top to the bottom level of planning pyramid and performances of functional strategies trickle up the line to give shape to the business performance and then to the corporate performance.

Question 3

Discuss the methods of valuation in brief.

Answer

The evaluation of sustainable growth strategy calls for interface of financial planning approach with strategic planning approach. Choice of the degree of sustainability approach for sustainability and modification in the sustainability principle must be based on financial evaluation of the alternative schemes in terms of financial and overall corporate objectives. There are two alternative methods for evaluation. They are:

- (a) **Valuation Method:** Valuation method depends on demand curve approach by either making use of expressed preferences or making use of revealed preferences.
- (b) **Pricing Method:** Pricing method is a non-demand curve approach that takes into consideration either opportunity costs or alternative costs or shadow projects or government payments or those response methods depending on the nature of the problem and environmental situation.

Valuation methods are in general more complex in implementation than pricing methods. But demand curve methods are more useful for cases where it seems likely that disparity between price and value is high.

PROJECT PLANNING AND CAPITAL BUDGETING

BASIC CONCEPTS AND FORMULAE

1. Feasibility Study

Project feasibility is a test by which an investment is evaluated.

2. Types of Feasibilities

(a) **Market Feasibility:** Demand and price estimates are determined from the market feasibility study. The market feasibility study for a product already selling in the market consists of:

- Study of economic factors and indicators;
- Demand estimation;
- Supply estimation;
- Identification of critical success factors; and
- Estimation of demand-supply gap, which is as follows:

Demand Surplus: Minimum = Min demand – Max supply

Likely = Likely demand – Likely supply

Maximum = Max demand – Likely supply

(b) **Technical Feasibility:** The commercial side of technical details has to be studied along with the technical aspects so that commercial viability of the technology can be evaluated. Project costs along with operating costs are derived from technical feasibility study.

(c) **Financial Feasibility:** Financial feasibility study requires detailed financial analysis based on certain assumptions, workings and calculations like Projections for prices and cost, Period of estimation, Financing alternatives, Financial statements and Computation of ratios such as debt-service coverage ratio (DSCR), net present value (NPV) or internal rate of return (IRR), Projected balance sheet and cash flow statement.

3. Contents of a Project Report

- Details about Promoters;
- Industry Analysis;
- Economic Analysis;
- Cost of Project;
- Inputs regarding raw material, suppliers, etc;
- Technical Analysis;
- Financial Analysis;
- Social Cost Benefit Analysis;
- SWOT Analysis; and
- Project Implementation Schedule.

4. Post Completion Audit

Post-completion audit evaluates actual performance with projected performance. It verifies both revenues and costs.

5. Social Cost Benefit Analysis

Social cost benefits analysis is an approach for evaluation of projects. A technique for appraising isolated projects from the point of view of society as a whole. It assesses gains/losses to society as a whole from the acceptance of a particular project.

Estimation of shadow prices forms the core of social cost benefit methodology. Economic resources have been categorised into goods, services, labour, foreign exchange, shadow price of investment vis-à-vis consumption, shadow price of future consumption vis-à-vis present consumption viz. social rate of discount.

6. Capital Budgeting Under Risk and Uncertainty

Risk denotes variability. Measures of variability used for risk:

- $\text{Range } (R_g) = R_h - R_l$

Where,

R_g à range of distribution

R_h à highest value of distribution

R_l à lowest value of distribution

- Mean Absolute Deviation (M.A.D) = $^n \sum_{i=1} p_i | R_i - \bar{R} |$

Where,

p_i → prob. with i th possible value

R_i → i th possible value of variable

$\bar{R}$ → Arithmetic Mean of distribution / variable

$|R_i - \bar{R}|$ → absolute deviation of i th value from mean.

- Standard Deviation (σ) = $[\sum p_i (R_i - \bar{R})^2]^{1/2}$

- Variance = σ^2

- C.V. = $\sigma / \bar{R}$

- S.V. = $\sum p_i (R_i - \bar{R})^2$

$$(R_i - \bar{R}) = (R_i - \bar{R}) \text{ when } R_i < \bar{R}$$

$$= 0 \text{ when } R_i > \bar{R}$$

7. Simulation Analysis

In simulation analysis a large number of scenarios are randomly generated and results are calculated to compute the risk.

Following are main steps in simulation analysis:

- Modelling the project. The model shows the relationship of N.P.V. with parameters and exogenous variables;
- Specify values of parameters and probability distributions of exogenous variables;
- Select a value at random from probability distribution of each of the exogenous variables;
- Determine N.P.V. corresponding to the randomly generated value of exogenous variables and pre-specified parameter variables;
- Repeat steps (3) & (4) a large number of times to get a large number of simulated N.P.V.s; and
- Plot frequency distribution of N.P.V.

8. Sensitivity Analysis

Also known as “What if analysis”. It is a useful method to know about the feasibility of a project in variable quantities, due to the uncertainty of the future. The steps in the Sensitivity Analysis are as follows:

- Set up relationship between the basic underlying factors (quantity sold, unit Sales Price, life of project etc.) and N.P.V. (some other criterion of merit);

- Estimate the range of variation and the most likely value of each of the basic underlying factors; and
- Study the effect of N.P.V. of variations in the basic variables (One factor is valued at a time).

9. Methods of Selection of Projects

- (a) Risk Adjusted Discount Rate Method: it means adjusting discount rate to reflect project risk.

Risk Adjusted Discount Rate for Project 'k' is given by

$$r_k = i + n + d_k$$

Where,

i = risk free rate of interest.

n = adjustment for firm's normal risk.

d_k = adjustment for different risk of project 'k'.

If the project's risk adjusted discount rate (r_k) is specified, the project is accepted if N.P.V. is positive.

$$N.P.V. = \sum_{t=1}^n A_t / (1 + r_k)^t - I$$

Where,

A_t = Annual Cash Flow

I = Initial Investment

- (b) Certainty Equivalent Method: Certainty Equivalent Coefficients transform expected values of uncertain flows into their Certainty Equivalents.

$$N.P.V. = \sum_{t=1}^n \alpha_t A_t / (1+i)^t - I$$

Value of Certainty Equivalent Coefficient (α_t) should lie between 0 and 1.

10. Capital Budgeting Under Capital Rationing

Investment appraisals under capital rationing should be to maximise N.P.V. of the set of investments selected. Due to disparity in the size of the projects, the objective cannot be fulfilled by merely choosing projects on the basis of individual N.P.V. ranking till the budget is exhausted. Combinations approach is adopted in such decisions, which is as follows:

- (a) Find all combinations of projects, which are feasible given the capital budget restriction and project interdependencies; and
- (b) Select the feasible combination having highest N.P.V.

11. Capital Budgeting Under Inflation

Adjustment for inflation is a necessity for capital investment appraisal as inflation will raise the revenues and costs of the project. The net revenues after adjustment for inflation shall be equal to net revenues in current terms.

- Annual after tax cash inflow of a project is equal to

$$(R - C - D)(1 - T) + D = (R - C)(1 - T) + DT$$

Where,

R = Revenue from project

C = Costs (apart from depreciation) relating to the project

D = Depreciation charges

T = Tax Rate.

- Due to inflation investors require the normal rate of interest to be equal to the actual required rate of return + Rate of inflation.

Where,

$$R_N = R_R + P$$

R_N = Required rate of return in nominal terms.

R_R = Required rate of return in real terms.

P = Anticipated inflation rate.

- N.P.V. based on consideration of inflation in revenues and costs is given by (effect of inflation on projected cash flows when discount factor contains inflation premium)

$$N.P.V. = \sum_{t=1}^n [(R_t (1+i_r)^t - C_t (1+i_r)^t) (1-T) + D_t T] / (1+k)^t - I_0$$

Where,

i_r = Annual inflation rate in revenues for 'r th' year.

C_t = Costs for year 't' with no inflation.

i_r = Annual inflation rate of costs for year 'r'.

T = Tax rate.

D_t = Depreciation charge for year 't'.

I_0 = Initial outlay.

K = Cost of capital (with inflation premium).

12. Decision Trees

By drawing a decision tree, the alternations available to an investment decision are highlighted through a diagram, giving the range of possible outcomes.

The stages set for drawing a decision tree is based on the following rules:

- It begins with a decision point, also known as decision node, represented by a rectangle while the outcome point, also known as chance node, denoted by a circle.
- Decision alternatives are shown by a straight line starting from the decision node.
- The Decision Tree Diagram is drawn from left to right. Rectangles and circles have to be next sequentially numbered.
- Values and Probabilities for each branch are to be incorporated next.
- The expected monetary value (EMV) at the chance node with branches emanating from a circle is the aggregate of the expected values of the various branches that emanate from the chance node.
- The expected value at a decision node with branches emanating from a rectangle is the highest amongst the expected values of the various branches that emanate from the decision node.

13. Capital Asset Pricing Model Approach to Capital Budgeting

It is based on the presumption that total risk of an investment consists of two components (1) Systematic risk (2) Unsystematic risk.

To measure systematic risk and unsystematic risk, the regression relationship used is:

$$R_{jt} = \alpha_j + \beta_j R_{mt} - e_{jt}$$

Where,

R_j = Return on investment j (a project) in period t

R_{mt} = Return on the market portfolio in period t

$\alpha_j E$ = Intercept of the linear regression relationship between R_{jt} and R_{mt}

β_j = Slope of the linear regression relationship between R_{jt} and R_{mt}

As CAPM is based on the assumption that the error term is 0, therefore, the expected value and variance of R_{jt} are:

$$E(R_{jt}) = \alpha_j + \beta_j E(R_{mt}) + 0 = \alpha_j + \beta_j E(R_{mt})$$

$$\text{Var}(R_{jt}) = \beta_j^2 \sigma_m^2 + 0 = \beta_j^2 \sigma_m^2 + 0$$

Slope of the regression model is:

$$\beta_j^2 = p_{jm} S_j S_m / S^2_M$$

14. Estimating the Beta of a Capital Project: Calculation of Project Beta on the Project's Market Values One-period return of a project is:

$$R_{jt} = (A_{jt} + V_{jt} - V_{j,t-1}) / V_{j,t-1}$$

Project Selection

A project z is acceptable when:

$$[E(R_z) - R_f] / \beta_z > E(R_m) - R_f$$

15. Replacement Decision

A decision concerning whether an existing asset should be replaced by a newer version of the same machine or even a different type of machine that does the same thing as the existing machine.

Steps in Analysis of Replacement Decision

Step I. Net cash outflow (assumed at current time):

- Book value of old system - market value of old system = operating profit/loss from sale
- Operating profit/loss x tax rate = Tax payable/savings from sale
- Cost of new system - (tax payable/savings from sale + market value of old system) = Net cash outflow

Step II. Estimated change in cash flows per year if replacement decision is implemented

Change in cash flow = ((Change in sales + Change in operating costs) - Change in depreciation) (1-tax rate) + Change in depreciation

Step III. Present value of benefits = Present value of yearly cash flows + Present value of estimated salvage of new system

Step IV. Present value of costs = Net cash outflow

Step V. Net present value = Present value of benefits - Present value of costs

Step VI. Decision rule: Accept when present value of benefits > Present value of costs. Reject when the opposite is true.

16. Real Option in Capital Budgeting

An option gives the holder of the option the right, but not the obligation to buy or sell

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a given amount of underlying asset at a fixed price (strike price or exercise price) at or before the expiration date of the option.

The following is a list of options that may exist in a capital budgeting project:

Long Call:

- Right to invest at some future date, at a certain price
- Generally, any flexibility to invest, to enter a business.

Long Put:

- Right to sell at some future date at a certain price
- Right to abandon at some future date at zero or some certain price
- Generally, any flexibility to disinvest, to exit from a business.

Short Call:

- Promise to sell if the counterparty wants to buy
- Generally, any commitment to disinvest upon the action of another party.

Short Put:

- Promise to buy if the counterparty wants to sell
- Generally, any commitment to invest upon the action of another party.

17. The Binomial Model of Option Pricing

It is based upon a simple formulation for the asset price process, in which the asset, in any time period, can move to one of two possible prices.

$D = \text{Number of units of the underlying asset bought} = (C_u - C_d) / (S_u - S_d)$

Where,

C_u = Value of the call if the stock price is S_u

C_d = Value of the call if the stock price is S_d

Value of the call = Current value of underlying asset * Option Delta - Borrowing needed to replicate the option

18. The Black-Scholes Model

The Black-Scholes model applies when the limiting distribution is the normal distribution, and it explicitly assumes that the price process is continuous and that there are no jumps in asset prices.

Value of call = $SN(d_1) - Ke^{-rt} N(d_2)$

Where,

$$d_1 = [\ln(S/K) + (r + s^2/2)T] / s\sigma\sqrt{T}$$

$$d_2 = d_1 - s\sigma\sqrt{T}$$

$$\text{Value of Option to Switch} = P_G N(d_1) - P_J N(d_2)$$

$$d_1 = [\ln(P_G/P_J) + v^2 T/2] / v\sqrt{T}$$

$$d_2 = d_1 - v\sqrt{T}$$

Question 1

What are the issues that need to be considered by an Indian investor and incorporated within the Net Present Value (NPV) model for the evaluation of foreign investment proposals?

Answer

The issues that need to be considered by an Indian investor and incorporated within the Net Present Value (NPV) model for the evaluation of foreign investment proposals are the following:

- (1) *Taxes on income associated with foreign projects:* The host country levies taxes (rates differ from country to country) on the income earned in that country by the Multi National Company (MNC). Major variations that occur regarding taxation of MNC's are as follows:
 - (i) Many countries rely heavily on indirect taxes such as excise duty; value added tax and turnover taxes etc.
 - (ii) Definition of taxable income differs from country to country and also some allowances e.g. rates allowed for depreciation.
 - (iii) Some countries allow tax exemption or reduced taxation on income from certain "desirable" investment projects in the form of tax holidays, exemption from import and export duties and extra depreciation on plant and machinery etc.
 - (iv) Tax treaties entered into with different countries e.g. double taxation avoidance agreements.
 - (v) Offer of tax havens in the form of low or zero corporate tax rates.
- (2) *Political risks:* The extreme risks of doing business in overseas countries can be seizure of property/nationalisation of industry without paying full compensation. There are other ways of interferences in the operations of foreign subsidiary e.g. levy of additional taxes on profits or exchange control regulations may block the flow of funds, restrictions on employment of foreign managerial/technical personnel,

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restrictions on imports of raw materials/supplies, regulations requiring majority ownership vetting within the host country.

NPV model can be used to evaluate the risk of expropriation by considering probabilities of the occurrence of various events and these estimates may be used to calculate expected cash flows. The resultant expected net present value may be subjected to extensive sensitivity analysis.

- (3) *Economic risks:* The two principal economic risks which influence the success of a project are exchange rate changes and inflation.

The impact of exchange rate changes and inflation upon incremental revenue and upon each element of incremental cost needs to be computed.

Question 2

Many companies calculate the internal rate of return of the incremental after-tax cash-flows from financial leases.

What problems do you think this may give rise to? To what rate should the internal rate of return be compared? Discuss.

Answer

Main problems faced in using Internal Rate of Return can be enumerated as under:

- (1) The IRR method cannot be used to choose between alternative lease bases with different lives or payment patterns.
- (2) If the firms do not pay tax or pay at constant rate, then IRR should be calculated from the lease cash-flows and compared to after-tax rate of interest. However, if the firm is in a temporary non-tax paying status, its cost of capital changes over time, and there is no simple standard of comparison.
- (3) Another problem is that risk is not constant. For the lessee, the payments are fairly riskless and interest rate should reflect this. The salvage value for the asset, however, is probably much riskier. As such two discount rates are needed. IRR gives only one rate, and thus, each cash-flow is not implicitly discounted to reflect its risk.
- (4) Multiple roots rarely occur in capital budgeting since the expected cashflow usually changes signs once. With leasing, this is not the case often. A lessee will have an immediate cash inflow, a series of outflows for a number of years, and then a n inflow during the terminal year. With two changes of sign, there may be, in practice frequently two solutions for the IRR.

Question 3

Distinguish between Net Present-value and Internal Rate of Return.

Answer

NPV and IRR: NPV and IRR methods differ in the sense that the results regarding the choice of an asset under certain circumstances are mutually contradictory under two methods. In case of mutually exclusive investment projects, in certain situations, they may give contradictory results such that if the NPV method finds one proposal acceptable, IRR favours another. The different rankings given by the NPV and IRR methods could be due to size disparity problem, time disparity problem and unequal expected lives.

The net present value is expressed in financial values whereas internal rate of return (IRR) is expressed in percentage terms.

In net present value cash flows are assumed to be re-invested at cost of capital rate. In IRR re-investment is assumed to be made at IRR rates.

Question 4

Write short note on Certainty Equivalent Approach.

Answer

Certainty Equivalent Approach (CE): This approach recognizes risk in capital budgeting analysis by adjusting estimated cash flows and employs risk free rate to discount the adjusted cash-flows. Under this method, the expected cash flows of the project are converted to equivalent riskless amounts. The greater the risk of an expected cash flow, the smaller the certainty equivalent values for receipts and longer the CE value for payment. This approach is superior to the risk adjusted discounted approach as it can measure risk more accurately.

This is yet another approach for dealing with risk in capital budgeting to reduce the forecasts of cash flows to some conservative levels. In certainty Equivalent approach we incorporate risk to adjust the cash flows of a proposal so as to reflect the risk element. The certainty Equivalent approach adjusts future cash flows rather than discount rates. This approach explicitly recognizes risk, but the procedure for reducing the forecasts of cash flows is implicit and likely to be inconsistent from one investment to another.

Question 5

What is the sensitivity analysis in Capital Budgeting?

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Answer

Sensitivity Analysis in Capital Budgeting: Sensitivity analysis is used in Capital budgeting for more precisely measuring the risk. It helps in assessing information as to how sensitive are the estimated parameters of the project such as cash flows, discount rate, and the project life to the estimation errors. Future being always uncertain and estimations are always subject to error, sensitivity analysis takes care of estimation errors by using a number of possible outcomes in evaluating a project. The methodology adopted in sensitivity analysis is to evaluate a project by using a number of estimated cash flows so as to provide to the decision maker an insight into the variability of outcome. Thus, it is a technique of risk analysis which studies the responsiveness of a criterion of merit like NPV or IRR to variation in underlying factors like selling price, quantity sold, returns from an investment etc.

Sensitivity analysis answers questions like,

- (i) What happens to the present value (or some other criterion of merit) if flows are, say Rs. 50,000 than the expected Rs. 80,000?
- (ii) What will happen to NPV if the economic life of the project is only 3 years rather than expected 5 years?

Therefore, wherever there is an uncertainty, of whatever type, the sensitivity analysis plays a crucial role. However, it should not be viewed as the method to remove the risk or uncertainty, it is only a tool to analyse and measure the risk and uncertainty. In terms of capital budgeting the possible cash flows are based on three assumptions:

- (a) Cash flows may be worst (pessimistic)
- (b) Cash flows may be most likely.
- (c) Cash flows may be most optimistic.

Sensitivity analysis involves three steps

- (1) Identification of all those variables having an influence on the project's NPV or IRR.
- (2) Definition of the underlying quantitative relationship among the variables.
- (3) Analysis of the impact of the changes in each of the variables on the NPV of the project.

The decision maker, in sensitivity analysis always asks himself the question – what if?

Question 6

Write short note on Social Cost Benefit analysis.

Answer

Social Cost Benefit Analysis: It is increasingly realised that commercial evaluation of projects is not enough to justify commitment of funds to a project especially when the project belongs to public utility and irrespective of its financial viability it needs to be implemented in the interest of the society as a whole. Huge amount of funds are committed every year to various public projects of all types—industrial, commercial and those providing basic infrastructure facilities. Analysis of such projects has to be done with reference to the social costs and benefits since they cannot be expected to yield an adequate commercial rate of return on the funds employed at least during the short period. A social rate of return is more important. The actual costs or revenues do not necessarily reflect the monetary measurement of costs or benefits to the society. This is because the market price of goods and services are often grossly distorted due to various artificial restrictions and controls from authorities, hence a different yardstick has to be adopted for evaluating a particular project of social importance and its costs and benefits are valued at 'opportunity cost' or shadow prices to judge the real impact of their burden as costs to the society. Thus, social cost benefit analysis conducts a monetary assessment of the total cost and revenues or benefits of a project, paying particular attention to the social costs and benefits which do not normally feature in conventional costing.

United Nations Industrial Development Organisation (UNIDO) and Organisation of Economic Cooperation and Development (OECD) have done much work on Social Cost Benefit analysis. A great deal of importance is attached to the social desirability of projects like employment generation potential, value addition, foreign exchange benefit, living standard improvement etc. UNIDO and OECD approaches need a serious consideration in the calculation of benefits and costs to the society. This technique has got more relevance in the developing countries where public capital needs precedence over private capital.

Question 7

Write a brief note on project appraisal under inflationary conditions.

Answer**Project Appraisal under Inflationary Conditions**

Project Appraisal normally involves feasibility evaluation from technical, commercial, economic and financial aspects. It is generally an exercise in measurement and analysis of cash flows expected to occur over the life of the project. The project cash outflows usually occur initially and inflows come in the future.

During inflationary conditions, the project cost increases on all heads viz. labour, raw material, fixed assets such as equipments, plant and machinery, building material,

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remuneration of technicians and managerial personnel etc. Beside this, inflationary conditions erode purchasing power of consumers and affect the demand pattern. Thus, not only cost of production but also the projected statement of profitability and cash flows are affected by the change in demand pattern. Even financial institutions and banks may revise their lending rates resulting in escalation in financing cost during inflationary conditions. Under such circumstances, project appraisal has to be done generally keeping in view the following guidelines which are usually followed by government agencies, banks and financial institutions.

- (i) It is always advisable to make provisions for cost escalation on all heads of cost, keeping in view the rate of inflation during likely period of delay in project implementation.
- (ii) The various sources of finance should be carefully scrutinised with reference to probable revision in the rate of interest by the lenders and the revision which could be effected in the interest bearing securities to be issued. All these factors will push up the cost of funds for the organization.
- (iii) Adjustments should be made in profitability and cash flow projections to take care of the inflationary pressures affecting future projections.
- (iv) It is also advisable to examine the financial viability of the project at the revised rates and assess the same with reference to economic justification of the project. The appropriate measure for this aspect is the economic rate of return for the project which will equate the present value of capital expenditures to net cash flows over the life of the projects. The rate of return should be acceptable which also accommodates the rate of inflation per annum.
- (v) In an inflationary situation, projects having early payback periods should be preferred because projects with long payback period are more risky.

Under conditions of inflation, the project cost estimates that are relevant for a future date will suffer escalation. Inflationary conditions will tend to initiate the measurement of future cash flows. Either of the following two approaches may be used while appraising projects under such conditions:

- (i) Adjust each year's cash flows to an inflation index, recognising selling price increases and cost increases annually; or
- (ii) Adjust the 'Acceptance Rate' (cut-off) suitably retaining cash flow projections at current price levels.

An example of approach (ii) above can be as follows:

Normal Acceptance Rate : 15.0%

Expected Annual Inflation : 5.0%

Adjusted Discount Rate : 15.0×1.05 or 15.75%

It must be noted that measurement of inflation has no standard approach nor is easy. This makes the job of appraisal a difficult one under such conditions.

Question 8

What is Capital rationing?

Answer

Capital Rationing: When there is a scarcity of funds, capital rationing is resorted to. Capital rationing means the utilization of existing funds in most profitable manner by selecting the acceptable projects in the descending order or ranking with limited available funds. The firm must be able to maximize the profits by combining the most profitable proposals. Capital rationing may arise due to (i) external factors such as high borrowing rate or non-availability of loan funds due to constraints of Debt-Equity Ratio; and (ii) Internal Constraints Imposed by management. Project should be accepted as a whole or rejected. It cannot be accepted and executed in piecemeal.

IRR or NPV are the best basis of evaluation even under Capital Rationing situations. The objective is to select those projects which have maximum and positive NPV. Preference should be given to interdependent projects. Projects are to be ranked in the order of NPV. Where there is multi-period Capital Rationing, Linear Programming Technique should be used to maximize NPV. In times of Capital Rationing, the investment policy of the company may not be the optimal one.

In nutshell Capital Rationing leads to:

- (i) Allocation of limited resources among ranked acceptable investments.
- (ii) This function enables management to select the most profitable investment first.
- (iii) It helps a company use limited resources to the best advantage by investing only in the projects that offer the highest return.
- (iv) Either the internal rate of return method or the net present value method may be used in ranking investments.

Question 9

Comment briefly on the social cost benefit analysis in relation to evaluation of an Industrial project.

Answer

Social Cost-Benefit Analysis of Industrial Projects

This refers to the moral responsibility of both PSU and private sector enterprises to undertake socially desirable projects – that is, the social contribution aspect needs to be kept in view.

Industrial capital investment projects are normally subjected to rigorous feasibility analysis and cost benefit study from the point of view of the investors. Such projects, especially large ones often have a ripple effect on other sections of society, local environment, use of scarce national resources etc. Conventional cost-benefit analysis ignores or does not take into account or ignores the societal effect of such projects. Social Cost Benefit (SCB) is recommended and resorted to in such cases to bring under the scanner the social costs and benefits.

SCB sometimes changes the very outlook of a project as it brings elements of study which are unconventional yet very relevant. In a study of a famous transportation project in the UK from a normal commercial angle, the project was to run an annual deficit of more than 2 million pounds. The evaluation was adjusted for a realistic fare structure which the users placed on the services provided which changed the picture completely and the project got justified. Large public sector/service projects especially in under-developed countries which would get rejected on simple commercial considerations will find justification if the social costs and benefits are considered.

SCB is also important for private corporations who have a moral responsibility to undertake socially desirable projects, use scarce natural resources in the best interests of society, generate employment and revenues to the national exchequer.

Indicators of the social contribution include

- (a) Employment potential criterion;
- (b) Capital output ratio – that is the output per unit of capital;
- (c) Value added per unit of capital;
- (d) Foreign exchange benefit ratio.

Question 10

- (a) *Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs Rs. 1,50,000 and will last for 3 years. It costs Rs. 40,000 per year to run. Machine B is an 'economy' model costing only Rs. 1,00,000, but will last only for 2 years, and costs Rs. 60,000 per year to run. These are real cash flows. The costs*

are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10 per cent. Which machine company X should buy?

- (b) Company Y is operating an elderly machine that is expected to produce a net cash inflow of Rs. 40,000 in the coming year and Rs. 40,000 next year. Current salvage value is Rs. 80,000 and next year's value is Rs. 70,000. The machine can be replaced now with a new machine, which costs Rs. 1,50,000, but is much more efficient and will provide a cash inflow of Rs. 80,000 a year for 3 years. Company Y wants to know whether it should replace the equipment now or wait a year with the clear understanding that the new machine is the best of the available alternatives and that it in turn be replaced at the optimal point. Ignore tax. Take opportunity cost of capital as 10 per cent. Advise with reasons.

Answer

- (a) Statement showing the evaluation of two machines

Machines	A	B
Purchase cost (Rs.): (i)	1,50,000	1,00,000
Life of machines (years)	3	2
Running cost of machine per year (Rs.): (ii)	40,000	60,000
Cumulative present value factor for 1-3 years @ 10% (iii)	2,486	-
Cumulative present value factor for 1-2 years @ 10% (iv)	-	1.735
Present value of running cost of machines (Rs.): (v)	99,440	1,04,100
	[(ii) × (iii)]	[(ii) × (iv)]
Cash outflow of machines (Rs.): (vi) = (i) + (v)	2,49,440	2,04,100
Equivalent present value of annual cash outflow	1,00,338	1,17,637
	[(vi) ÷ (iii)]	[(vi) ÷ (iv)]

Decision: Company X should buy machine A since its equivalent cash outflow is less than machine B.

- (b) Statement showing present value of cash inflow of new machine when it replaces elderly machine now

	Rs.
Cash inflow of a new machine per year	80,000
Cumulative present value for 1-3 years @ 10%	2.486
Present value of cash inflow for 3 years (Rs. 80,000 × 2.486)	1,98,880

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		Rs.
Less: Cash outflow		
Purchase cost of new machine	1,50,000	
Less: Salvage value of old machine	<u>80,000</u>	<u>70,000</u>
N.P.V. of cash inflow for 3 years		1,28,880
Equivalent annual net present value of cash		
Inflow of new machine	$\frac{\text{Rs. } 1,28,880}{2.486}$	51,842

Statement showing present value of cash inflow of new machine when it replaces elderly machine next year

		Rs.
Cash inflow of a new machine per year		80,000
Cumulative present value for 1-3 years @ 10%		2.486
Present value of cash inflow for 3 years (Rs. 80,000 × 2.486)		1,98,880
		Rs.
Less: Cash outflow		
Purchase cost of new machine	1,50,000	
Less: Salvage value of old machine	<u>70,000</u>	<u>80,000</u>
N.P.V. of cash inflow for 3 years		1,18,880
Equivalent annual net present value of cash Inflow	$\frac{\text{Rs. } 1,18,880}{2.486}$	47,820

Advise: Since the equivalent annual cash inflow of new machine now and next year is more than cash inflow (Rs. 40,000) of an elderly machine the company Y is advised to replace the elderly machine now.

Company Y need not wait for the next year to replace the elderly machine since the equivalent annual cash inflow now is more than the next year's cash inflow.

Question 11

A private university with a current enrolment of 12,000 students is reviewing cost and revenue data for the past academic year. Student tuition is Rs. 3,600 a year. Tuition normally covers 75 per cent of university expenditures. The remaining 25 per cent comes from endowments and contributions. During the last academic year fixed costs amounted to

Rs. 300 lakhs. The rest of the costs varied with student enrolment. Cost have been rising more rapidly than tuition or contributions, and the university just broke even last year. A tuition increase is being contemplated. The budget committee thinks endowment revenues and contributions will remain constant at last years' level for the next several years.

The fixed costs are expected to increase by Rs. 30 lakhs and the variable costs are expected to increase by 10 per cent. The president of the university tells the budget committee that he expects a new grant of Rs. 50 lakhs in addition to the normal contributions for each of the next 5 years from a large corporation owned by an alumnus of the university. The university has been postponing a number of major capital improvements and building projects.

Required:

- (i) If the grant is received and tuition is raised to Rs. 4,200, how much money would the university have available in the first year for capital improvements and building with student enrolment of 11,200 and the expected cost increases?
- (ii) If the grant is received and costs increases as predicted for the coming year, what tuition should the university charge to break-even with its current enrolment of 12,000 students after providing Rs. 40.40 lakhs for capital improvements?

Answer

Past academic year

	(Rs. in lakhs)
Student's tuition @ Rs. 3,600 ´ 12,000 students – (75%)	432
Endowment and contribution – (25%)	<u>144*</u>
Total cost	576*
25% of total cost i.e. $\frac{100}{75} \times 432 = \text{Rs. } 576 \text{ lakhs}$	
Less: fixed cost	<u>300</u>
Variable cost	<u>276</u>
Hence variable cost per student = $\frac{\text{Rs. } 276 \text{ lakhs}}{12,000 \text{ students}} = \text{Rs. } 2,300$	

*Out of fixed cost of Rs. 300 lakhs, endowment and contribution is of Rs. 144 lakhs.

Statement showing the money which would be available to the university in first year for capital improvements and building

	(Rs. in lakhs)
(i) Tuition fee Rs. 4,200 ´ 11,200 students	470.40

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Add: Endowment and contribution	144.00	
Grant	<u>50.00</u>	<u>194.00</u>
		664.40
Less: Variable cost – Rs. 2,300 ´ 1.10 ´ 11,200 students	283.36	
Fixed cost – Rs. 300 lakhs + Rs. 30 lakhs	<u>330.00</u>	<u>613.36</u>
Balance for capital improvements		<u>51.04</u>

Statement showing the tuition fee which university should charge to break-even

(ii)	Variable cost – Rs. 2,300 ´ 1.10 ´ 12,000 students	303.60
	Add: Fixed cost Rs. 300 lakhs + Rs. 30 lakhs	330.00
	Capital improvements	<u>40.40</u>
	Total cost	674.00
	Less: Endowment, contribution and grants	<u>194.00</u>
	Balance from tuitions	<u>480.00</u>

Hence, tuition fee which university should charge from each student.

$$= \frac{\text{Rs. 480 lakhs}}{12,000 \text{ students}} = \text{Rs. 4,000 per student.}$$

Question 12

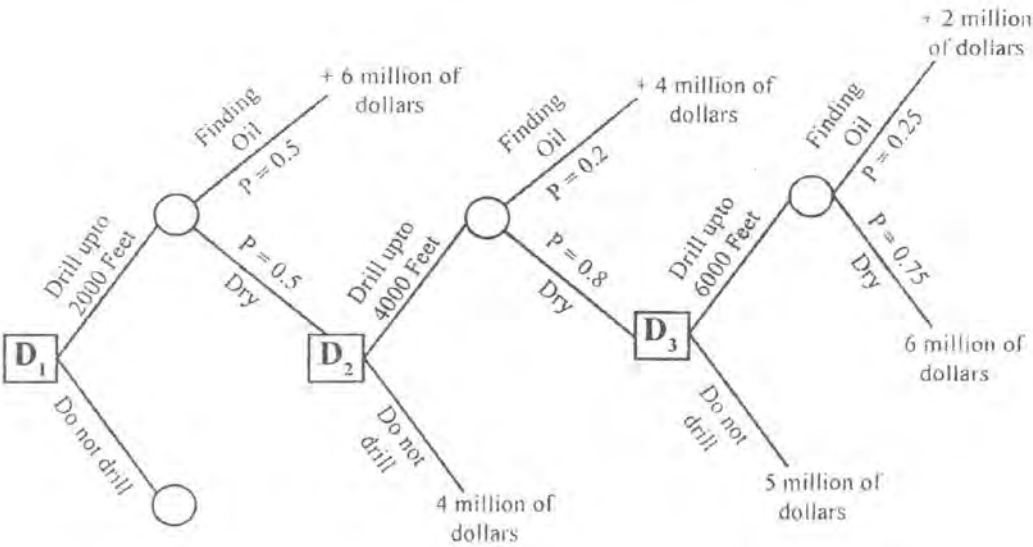
Big Oil is wondering whether to drill for oil in Westchester Country. The prospectus is as follows:

Depth of Well Feet	Total Cost Millions of Dollars	Cumulative Probability of Finding Oil	PV of Oil (If found) Millions of Dollars
2,000	4	0.5	10
4,000	5	0.6	9
6,000	6	0.7	8

Draw a decision tree showing the successive drilling decisions to be made by Big Oil. How deep should it be prepared to drill?

Answer

The given data is easily represented by the following decision tree diagram:



There are three decision points in the tree indicated by D₁, D₂ and D₃.

Using rolling back technique, we shall take the decision at decision point D₃ first and then use it to arrive decision at a decisions point D₂ and then use it to arrive decision at a decision point D₁.

Statement showing the evaluation of decision at Decision Point D₃

Decision	Event	Probability	P.V. of Oil (if found) (Millions of dollars)	Expected P.V. of Oil (if found) (Millions of dollars)
1. Drill upto	Finding Oil	0.25	+ 2	0.50
6,000 feet	Dry	0.75	- 6	- 4.50
(Refer to working note)				<u>- 4.00</u>
2. Do not drill				<u>- 5.00</u>

Since the Expected P.V. of Oil (if found) on drilling upto 6,000 feet – 4 millions of dollars is greater than the cost of not drilling – 5 millions of dollars. Therefore, Big Oil should drill upto 6,000 feet.

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Statement showing the evaluation of decision at Decision Point D₂

<i>Decision</i>	<i>Event</i>	<i>Probability</i>	<i>P.V. of Oil (if found) (Millions of dollars)</i>	<i>Expected P.V. of Oil (if found) (Millions of dollars)</i>
1. Drill upto	Finding Oil	0.2	4	0.8
4,000 feet	Dry	0.8	- 4	- 3.2
	(Refer to working note)			<u>- 2.4</u>
2. Do not drill				<u>- 4</u>

Since the Expected P.V. of Oil (if found) on drilling upto 4,000 feet – 2.4 millions of dollars is greater than the cost of not drilling – 4 millions of dollars. Therefore, Big Oil should drill upto 4,000 feet.

Statement showing the evaluation of decision at Decision Point D₁

<i>Decision</i>	<i>Event</i>	<i>Probability</i>	<i>P.V. of Oil (if found) (Millions of dollars)</i>	<i>Expected P.V. of Oil (if found) (Millions of dollars)</i>
1. Drill upto	Finding Oil	0.5	6	3.0
2,000 feet	Dry	0.5	- 2.4	- 1.2
	(Refer to working note)			<u>1.8</u>
2. Do not drill				NIL

Since the Expected P.V. of Oil (if found) on drilling upto 2,000 feet is 1.8 millions of dollars (positive), Big Oil should drill upto 2,000 feet.

Working Notes:

Let x be the event of not finding oil at 2,000 feet and y be the event of not finding oil at 4,000 feet and z be the event of not finding oil at 6,000 feet.

We know, that,

$$P(x \text{ \& } y) = P(x) \cdot P(y/x)$$

Where, $P(x \text{ \& } y)$ is the joint probability of not finding oil at 2,000 feet and 4,000 feet, $P(x)$ is the probability of not finding oil at 2,000 feet and $P(y/x)$ is the probability of not finding oil at 4,000 feet, if the event x has already occurred.

$$\begin{aligned} P(x \text{ } \bar{y}) &= 1 - \text{Cumulative probability of finding oil at 4,000 feet} \\ &= 1 - 0.6 = 0.4 \end{aligned}$$

$$\begin{aligned} P(x) &= 1 - \text{Probability of finding oil at 2,000 feet} \\ &= 1 - 0.5 = 0.5 \end{aligned}$$

$$\text{Hence, } P(y/x) = \frac{P(x \text{ } \bar{y})}{P(x)} = \frac{0.4}{0.5} = 0.8$$

Therefore, probability of finding oil between 2,000 feet to 4,000 feet = $1 - 0.8 = 0.2$ we know that

$$P(x \text{ } \bar{y} \text{ } \bar{z}) = P(x) \cdot P(y/x) \cdot P(z/x \text{ } \bar{y})$$

Where $P(x \text{ } \bar{y} \text{ } \bar{z})$ is the joint probability of not finding oil at 2,000 feet, 4,000 feet and 6,000 feet, $P(x)$ and $P(y/x)$ are as explained earlier and $P(z/x \text{ } \bar{y})$ is the probability of not finding oil at 6,000 feet if the event x and y has already occurred.

$$\begin{aligned} P(x \text{ } \bar{y} \text{ } \bar{z}) &= 1 - \text{Cumulative probability of finding oil at 6,000 feet} \\ &= 1 - 0.7 = 0.3 \end{aligned}$$

$$P(z/x \text{ } \bar{y}) = \frac{P(x \text{ } \bar{y} \text{ } \bar{z})}{P(x) \cdot P(y/x)} = \frac{0.3}{0.5 \cdot 0.8} = \frac{0.3}{0.4} = 0.75$$

Therefore, probability of finding oil between 4,000 feet to 6,000 feet = $1 - 0.75 = 0.25$

Question 13

Ze-Te Fashions is a high-fashion women's garments manufacturer. It is planning to introduce a new fashion garment in the market in the forthcoming Diwali season. Four metres of cloth (material) are required to layout the dress pattern. After cutting, some material remains that can be sold as a cut-piece. The left-over material can also be used to manufacture a matching cap and handbag.

Ze-Te expects to sell 2,500 dresses, if matching caps and handbags are not provided and 20% more, if matching caps and handbags are made available. The market research indicates that the cap and/or handbag cannot be sold independently, but only as accessories with the dress.

The following combination of sales is expected:

Complete sets of dress, can and handbag	68%
Dress and Cap only	12%

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<i>Dress and handbag only</i>	<i>09%</i>
<i>Dress only</i>	<u><i>11%</i></u>
	<u><i>100%</i></u>

The material used in the dress costs Rs. 60 per metre. The cost of cutting the dress, if the cap and handbag are not manufactured, is estimated at Rs. 20 a dress and the resulting remnants can be sold for Rs. 5 for each dress cut out.

If the cap and handbag are to be manufactured, it requires a more delicate and skillful cutting and hence cutting cost will increase by Rs. 8 per dress.

The selling prices and the other costs to complete the three items, once they are cut, are as follows:

	<i>Selling price per unit</i>	<i>Other costs per unit</i>
	<i>Rs.</i>	<i>Rs.</i>
<i>Dress</i>	<i>400.00</i>	<i>48.00</i>
<i>Cap</i>	<i>29.00</i>	<i>6.50</i>
<i>Handbag</i>	<i>18.00</i>	<i>3.00</i>

Other costs per unit exclude the cost of material and cutting.

You are required to prepare a statement showing:

- Should the company go in for caps and handbags along with dresses? Substantiate your answer.*
- What are the non-quantitative factors that could influence the company's decision to manufacture caps and handbags that match the dress?*

Answer

- Statement showing profitability of Ze-Te Fashions**

	<i>If matching caps and handbags are not provided with dresses</i>	<i>If matching caps and handbags are provided with dresses</i>
<i>Expected Sales/Forecasted Sales (pieces)</i>	<i>2,500</i>	<i>3,000</i>
	<i>Rs.</i>	<i>Rs.</i>
<i>Sales revenue: (A)</i>	<i>10,00,000</i>	<i>13,11,180</i>
	<i>(2,500 dresses × Rs. 400)</i>	<i>(Refer to working note 2)</i>

Costs		
Materials (i)	5,87,500	7,18,350
(Refer to working note 3)		
Cutting (ii)	50,000	81,360
	(2,500 dresses ´ Rs. 20)	(Refer to working note 4)
Others (iii)	1,20,000	1,66,530
	(2,500 dresses ´ Rs. 48)	(Refer to working note 5)
Total costs : (B) = [(i) + (ii) + (iii)]	7,57,500	9,66,240
Operating profit : (A) – (B)	2,42,500	3,44,940

Since, the company can earn an additional profit of Rs. 1,02,440 (Rs. 3,44,940 – Rs. 2,42,500) if matching caps and handbags are provided along with dresses. Therefore, the company should go for manufacturing matching caps and handbags and provide them along with dresses.

Working Notes:

- Expected sales in forthcoming season, if caps and handbags are provided with dresses:

Complete sets of dress, cap and handbag	(68% of 3,000)	2,040 dresses
Dress and cap only	(12% of 3,000)	360 dresses
Dress and handbag only	(9% of 3,000)	270 dresses
Dress only	(11% of 3,000)	<u>330 dresses</u>
		<u>3,000 dresses</u>

- Sales revenue of expected sales, if caps and handbags are provided with dresses.

	Rs.
Complete set of dress, cap and handbag (2,040 dresses ´ Rs. 447)	9,11,880
Dress and cap only (360 dresses ´ Rs. 429)	1,54,440
Dress and handbag only (270 dresses ´ Rs. 418)	1,12,860
Dress only (330 dresses ´ Rs. 400)	<u>1,32,000</u>
	<u>13,11,180</u>

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3. *Material*

	Rs.
For 2,500 dresses (4 metres ´ Rs. 60 per metre – Rs. 5) for 3,000 dresses	5,87,500
2,670 dresses (4 metres ´ Rs. 60 per metre) + 330 dresses (4 metres ´ Rs. 60 per metre – Rs. 5)	<u>7,18,350</u>

4. *Cutting costs for 3,000 dresses*

	Rs.
(2,670 dresses ´ Rs. 28 + 330 dresses ´ Rs. 20)	81,360

5. *Other costs for 3,000 dresses*

	Rs.
Complete set of dress, cap and handbag (2,040 dresses ´ Rs. 57.50)	1,17,300
Dress and cap only (360 dresses ´ Rs. 54.50)	19,620
Dress and handbag only (270 dresses ´ Rs. 51)	13,770
Dress only (330 dresses ´ Rs. 48)	<u>15,840</u>
	<u>1,66,530</u>

(b) Non-quantitative factors that could influence the company's decision to manufacture caps and handbags that match the dress are:

1. Reliability of various estimates of costs, sales and prices.
2. Proper consideration of quality in terms of design, colour and durability.
3. Timing of production and distribution of four combination i.e. complete set of dress, dress and cap, dress and handbags and dress only has been planned suitably in advance.
4. Effect on the production, sale of other product lines of Ze-Te Fashions has to be examined.

Question 14

XYZ Ltd., an infrastructure company is evaluating a proposal to build, operate and transfer a section of 35 kms. of road at a project cost of Rs. 200 crores to be financed as follows:

Equity Shares Capital Rs. 50 crores, loans at the rate of interest of 15% p.a. from financial institutions Rs. 150 crores. The Project after completion will be opened to traffic and a toll will be collected for a period of 15 years from the vehicles using the road. The company is

also required to maintain the road during the above 15 years and after the completion of that period, it will be handed over to the Highway authorities at zero value. It is estimated that the toll revenue will be Rs. 50 crores per annum and the annual toll collection expenses including maintenance of the roads will amount to 5% of the project cost. The company considers to write off the total cost of the project in 15 years on a straight line basis. For Corporate Income-tax purposes the company is allowed to take depreciation @ 10% on WDV basis. The financial institutions are agreeable for the repayment of the loan in 15 equal annual instalments – consisting of principal and interest.

Calculate Project IRR and Equity IRR. Ignore Corporate taxation.

Explain the difference in Project IRR and Equity IRR

Answer

Computation of Project IRR

Project IRR is computed by using the following equation:

Where,

CO_0 = Cash outflow at time zero

CF_i = Net cash inflow at different points of time

N = Life of the project and

R = Rate of discount (IRR)

Now,

CO_0 = Rs. 200 crores

CF_i = Rs. 40 crores p.a. for 15 years

(Refer to working note (i))

Therefore,

$$\text{Rs. 200 crore} = \frac{\text{Rs. 40 crores}}{(1+r)^{15}}$$

The value of IRR of the project:

1. An approximation of IRR is made on the basis of cash flow data. A rough approximation may be made with reference to the payback period. The payback period in the given case is 5 years i.e. $\frac{\text{Rs. 200 crores}}{\text{Rs. 40 crores}}$. From the PVAF table the closest figures are given in rate 18% (5.092) and the rate 19% (4.876). This means the IRR of the project is expected to be between 18% and 19%.

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2. The estimate of IRR cash inflow of the project for both these rates is as follows:

At 18% = Rs. 40 crores $\times$ PVAF (18%, 15 years)

= Rs. 40 crores $\times$ 5.092

= Rs. 203.68

At 19% = Rs. 40 crores $\times$ PVAF (19%, 15 years)

= Rs. 40 crores $\times$ 4.876

= Rs. 195.04

3. The exact IRR by interpolating between 18% and 19% is worked out as follows:

$$\text{IRR} = 18\% + \frac{\text{Rs. 203.68 crores} - \text{Rs. 200 crores}}{\text{Rs. 203.68 crores} - \text{Rs. 195.04 crores}} \times 1\%$$

$$= 18\% + \frac{\text{Rs. 3.68 crores}}{\text{Rs. 8.64 crores}} \times 1\%$$

$$= 18\% + 0.426\%$$

$$= 18.43\%$$

Therefore, the IRR of the project is 18.43%.

Working Notes:

- (i) Net cash inflow of the project

<i>Cash inflow</i>	Rs.
Toll revenue	50 crores p.a. for 15 years
<i>Cash outflow</i>	Rs.
Toll collection expenses including maintenance of the roads	10 crores p.a. for 15 years
(5% of Rs. 200 crores)	
Net cash inflow	<u>40 crores p.a. for 15 years</u>

Note: Since corporate taxes is not payable. The impact of depreciation need not be considered.

Computation of Equity IRR

Equity IRR is computed by using the following equation:

$$\text{Cash inflow at zero date from equity shareholders} = \frac{\text{Cash inflow available for equity shareholders}}{(1+r)^n}$$

Where,

r = Equity IRR

n = Life of the project

Here, Cash inflow at zero date from equity shareholders = Rs. 50 crores

Cash inflow for equity shareholders = Rs. 14.35 crores p.a.

(Refer to working note)

Therefore:

$$\text{Rs. 50 crores} = \frac{\text{Rs. 14.35 crores}}{(1+r)^{15}}$$

The value of equity IRR of the project is calculated as follows:

An approximation of IRR is made on the basis of cash flow data. A rough approximation may be made with reference to the payback period. The payback period

in the given case is $3.484 \frac{\text{Rs. 50 crores}}{\text{Rs. 14.35 crores}}$. From the PVAF table at 28% the

cumulative discount factor for 1 –15 years is 3.484. Therefore, the equity IRR of project is 28%.

(ii) *Equated annual instalment (i.e. principal + interest) of loan from financial institution:*

Amount of loan from financial institution	Rs. 150 crores
Rate of interest	15% p.a.
No. of years	15
Cumulative discount factor for 1-15 years	5.847

Hence, equated yearly instalment will be Rs. 150 crores/5.847 i.e. Rs. 25.65 crores.

(iii) *Cash inflow available for equity shareholders*

Net cash inflow of the project	Rs. 40.00 crores
[Refer to working note (i)]	
Equated yearly instalment of the project	Rs. 25.65 crores
[Refer to working note (ii)]	
Cash inflow available for equity shareholders	<u>Rs. 14.35 crores</u>

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Difference in Project IRR and Equity IRR:

The project IRR is 18.4% whereas Equity IRR is 28%. This is attributed to the fact that XYZ Ltd. is earning 18.4% on the loan from financial institution but paying only 15%. The difference between the return and cost of funds from financial institution has enhanced equity IRR. The 3.4% (18.4% - 15%) earnings on Rs. 150 crores goes to equity shareholders who have invested Rs. 50 crore i.e.

$$3.4\% \times \frac{\text{Rs. 150 crores}}{\text{Rs. 50 crores}} = 10.2\% \text{ is added to the project IRR which gives equity IRR of 28\%.}$$

Question 15

DD amusement Park charges Rs. 4 each for all rides in the park. Variable costs amount to Re. 0.80 per ride and fixed costs are Rs. 32,00,000. Last year's net income was Rs. 6,40,000 on sales of Rs. 48,00,000. Rising costs have cut sharply into net income for DD for the last 2 years. This year management again expects a cost increase of 25 per cent in variable costs and 10 per cent in fixed costs. To help offset these increases, the management is considering raising the price of a ride to Rs. 5.

Required:

- (1) How many rides did DD sell last year?*
- (2) If the price increase is not implemented, what s the expected net income for this year assuming the same volume of activity?*
- (3) Compute the price in difference point for the new ride price.*
- (4) Compute the Break-even point for this year using the old price and the new price.*
- (5) Should management raise the price of a ride, if the price increase will reduce ride volume 10 per cent from the last years' level? In that situation, what will be the expected net income?*

Answer

- (1) Rides which DD Amusement Park sell last year**

$$\begin{aligned} \text{(No. of rides DD sell last year)} &= \frac{\text{Total Sales of rides last year}}{\text{Charges per ride last year}} \\ &= \frac{\text{Rs. 48,00,000}}{\text{Rs. 4}} \\ &= \text{Rs. 12,00,000 rides} \end{aligned}$$

- (2) Expected net income for this year if price increase is not implemented

(Assuming the same volume of activity)

	Rs.
Charges per ride	4
Less: Expected Variable cost per ride (Refer to working note 1)	<u>1</u>
Contribution per ride: (A)	3
No. of rides : (B)	12,00,000
Total expected contribution for all rides: (C) = (A) × (B)	36,00,000
Less: Expected fixed costs (Refer to working note (ii))	<u>35,20,000</u>
Expected net income	<u>80,000</u>

- (3) Price indifference point for the new ride price

Price indifference point is a point at which the expected profits remains the same irrespective of sales price and costs.

	Rs.
New ride price	5.00
Less: Variable cost	<u>1.00</u>
Contribution per ride	<u>4.00</u>
Fixed costs of this year: (A)	35,20,000
Net income of last year: (B)	<u>6,40,000</u>
Contribution required: (A) + (B)	<u>41,60,000</u>

$$\text{Price - indifference point} = \frac{\text{Rs. } 41,60,000}{\text{Rs. } 4} = 10,40,000 \text{ rides}$$

- (4) Break even point for this year using the old price and the new price

$$\text{Break even point} = \frac{\text{Fixed costs}}{\text{Contribution per ride}}$$

$$\begin{aligned} \text{At old price} &= \frac{\text{Rs. } 35,20,000}{\text{Rs. } 4 - \text{Rs. } 1} \\ &= 11,73,334 \text{ rides} \end{aligned}$$

$$\begin{aligned} \text{At new price} &= \frac{\text{Rs. } 35,20,000}{\text{Rs. } 5 - \text{Rs. } 1} \\ &= 8,80,000 \text{ rides} \end{aligned}$$

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- (5) Expected net income if the price increase will reduce ride volume by 10% from the last year's levels.

	Rs.
Charges per ride	5.00
Less: Variable cost	<u>1.00</u>
Contribution per ride: (A)	<u>4.00</u>
No. of rides (12,00,000 – 1,20,000): (B)	10,80,000
Total contribution for all rides : (A) × (B)	43,20,000
Less: Fixed costs	<u>35,20,000</u>
Expected net income	<u>8,00,000</u>

Justification:

Since the increase in price of a ride will increase the net income by Rs. 1,60,000 (Rs. 8,00,000 – Rs. 6,40,000) the management should raise the price of a ride.

- (i) *Expected variable cost this year*

Variable cost last year	Re. 0.80 per ride
Add: Expected increase this year (25% of Re. 0.80)	<u>Re. 0.020 per ride</u>
Expected variable cost this year	<u>1.00 per ride</u>

- (ii) *Expected fixed costs this year*

	Rs.
Fixed costs last year	32,00,000
Add: Expected increase this year (10% of Rs. 32,00,000)	<u>3,20,000</u>
Expected fixed costs this year	<u>35,20,000</u>

Question 16

The total market value of the equity share of O.R.E. Company is Rs. 60,00,000 and the total value of the debt is Rs. 40,00,000. The treasurer estimate that the beta of the stock is currently 1.5 and that the expected risk premium on the market is 10 per cent. The treasury bill rate is 8 per cent.

Required:

- (1) What is the beta of the Company's existing portfolio of assets?
- (2) Estimate the Company's Cost of capital and the discount rate for an expansion of the company's present business.

Answer

$$(1) \quad b_{\text{company assets}} = b_{\text{equity}} \cdot \frac{V_E}{V_0} + b_{\text{debt}} \cdot \frac{V_D}{V_0}$$

If company's debt capital is riskless than above relationship become:

$$\text{Here } b_{\text{equity}} = 1.5 b_{\text{assets}} = b_{\text{equity}} \cdot \frac{V_E}{V_0}$$

$$b_{\text{debt}} = 0$$

Note: Since b_{debt} is not given it is assumed that company debt capital is virtually riskless.

$$V_E = \text{Rs. 60 lakhs.}$$

$$V_D = \text{Rs. 40 lakhs.}$$

$$V_0 = \text{Rs. 100 lakhs.}$$

$$b_{\text{company assets}} = 1.5 \cdot \frac{\text{Rs. 60 lakhs}}{\text{Rs. 100 lakhs}} \\ = 0.9$$

$$(2) \quad \text{Company's cost of capital} = b_8 \cdot b_A \cdot \text{Risk premium}$$

Where b_8 = Risk free rate of return

b_A = Beta of company assets

Therefore, company's cost of capital = $8\% + 0.9 \cdot 10 = 17\%$

In case of expansion of the company's present business, the same rate of return i.e. 17% will be used. However, in case of diversification into new business the risk profile of new business is likely to be different. Therefore, different discount factor has to be worked out for such business.

Question 17

X Ltd. an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be Rs. 120 lakhs and additional equipment costing Rs. 10 lakhs will be needed at the beginning of third year. At the end of the 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for Rs. 1 lakhs. Working Capital of Rs. 15 lakhs will be needed. The 100% capacity of the plant is of 4,00,000 units per annum, but the production and sales-volume expected are as under:

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Year	Capacity in percentage
1	20
2	30
3-5	75
6-8	50

A sale price of Rs. 100 per unit with a profit-volume ratio of 60% is likely to be obtained. Fixed Operating Cash Cost are likely to be Rs. 16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure in Rs. lakhs each year	30	15	10	4

The company is subject to 50% tax, straight-line method of depreciation, (permissible for tax purposes also) and taking 12% as appropriate after tax Cost of Capital, should the project be accepted?

Answer

(a) Computation of initial cash outlay

(Rs. in lakhs)

Equipment Cost (0)	120
Working Capital (0)	<u>15</u>
	<u>135</u>

Calculation of Cash Inflows:

Year	1	2	3-5	6-8
Sales in units	80,000	1,20,000	3,00,000	2,00,000
	Rs.	Rs.	Rs.	Rs.
Contribution @ Rs. 60 p.u.	48,00,000	72,00,000	1,80,00,000	1,20,00,000
Fixed cost	16,00,000	16,00,000	16,00,000	16,00,000
Advertisement	30,00,000	15,00,000	10,00,000	4,00,000
Depreciation	<u>15,00,000</u>	<u>15,00,000</u>	<u>16,50,000</u>	<u>16,50,000</u>
Profit/(loss)	(13,00,000)	26,00,000	1,37,50,000	83,50,000
Tax @ 50%	<u>Nil</u>	<u>13,00,000</u>	<u>68,75,000</u>	<u>41,75,000</u>

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Profit/(loss) after tax	(13,00,000)	13,00,000	68,75,000	41,75,000
Add: Depreciation	<u>15,00,000</u>	<u>15,00,000</u>	<u>16,50,000</u>	<u>16,50,000</u>
Cash Inflow	<u>2,00,000</u>	<u>28,00,000</u>	<u>85,25,000</u>	<u>58,25,000</u>

Computation of PV of CIF

Year	CIF	PV Factor @ 12%	
	Rs.		Rs.
1	2,00,000	.893	1,78,600
2	28,00,000	.797	22,31,600
3	85,25,000	.712	60,69,800
4	85,25,000	.636	54,21,900
5	85,25,000	.567	48,33,675
6	58,25,000	.507	29,53,275
7	58,25,000	.452	26,32,900
8	58,25,000	.404	29,99,700
WC	15,00,000		
SV	1,00,000		
			<u>2,73,21,450</u>

PV of COF 0 1,35,00,000

Additional Investment = Rs. 10,00,000	× .797	<u>7,97,000</u>	
	NPV		<u>1,42,97,000</u>
			<u>1,30,24,450</u>

Recommendation: Accept the project in view of positive NPV.

Question 18

Skylark Airways is planning to acquire a light commercial aircraft for flying class clients at an investment of Rs. 50,00,000. The expected cash flow after tax for the next three years is as follows:

(Rs.)

Year 1		Year 2		Year 3	
CFAT	Probability	CFAT	Probability	CFAT	Probability
14,00,000	0.1	15,00,000	0.1	18,00,000	0.2
18,00,000	0.2	20,00,000	0.3	25,00,000	0.5

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25,00,000	0.4	32,00,000	0.4	35,00,000	0.2
40,00,000	0.3	45,00,000	0.2	48,00,000	0.1

The Company wishes to take into consideration all possible risk factors relating to airline operations. The company wants to know:

- The expected NPV of this venture assuming independent probability distribution with 6 per cent risk free rate of interest.
- The possible deviation in the expected value.
- How would standard deviation of the present value distribution help in Capital Budgeting decisions?

Answer

- Expected NPV

(Rs. in lakhs)

Year I			Year II			Year III		
CFAT	P	CF×P	CFAT	P	CF×P	CFAT	P	CF×P
14	0.1	1.4	15	0.1	1.5	18	0.2	3.6
18	0.2	3.6	20	0.3	6.0	25	0.5	12.5
25	0.4	10.0	32	0.4	12.8	35	0.2	7.0
40	0.3	<u>12.0</u>	45	0.2	<u>9</u>	48	0.1	<u>4.8</u>
	$\bar{x}$ or $\overline{CF}$	<u>27.0</u>		$\bar{x}$ or $\overline{CF}$	<u>29.3</u>		$\bar{x}$ or $\overline{CF}$	<u>27.9</u>
NPV			PV factor @ 6%			Total PV		
27			0.943			25.461		
29.3			0.890			26.077		
27.9			0.840			<u>23.436</u>		
			PV of cash inflow			74.974		
			Less: Cash outflow			<u>50.000</u>		
			NPV			<u>24.974</u>		

- Possible deviation in the expected value

Year I					
$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_1	$(X - \bar{X})^2 P_1$	
14 – 27	-13	169	0.1	16.9	

18 – 27	-9	81	0.2	16.2
25 – 27	-2	4	0.4	1.6
40 – 27	13	169	0.3	<u>50.7</u>
				<u>85.4</u>

$$s_1 = \sqrt{85.4} = 9.241$$

Year II

$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_2	$(X - \bar{X})^2 \times P_2$
15-29.3	-14.3	204.49	0.1	20.449
20-29.3	-9.3	86.49	0.3	25.947
32-29.3	2.7	7.29	0.4	2.916
45-29.3	15.7	246.49	0.2	<u>49.298</u>
				<u>98.61</u>

$$s_2 = \sqrt{98.61} = 9.930$$

Year III

$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_3	$(X - \bar{X})^2 \times P_3$
18-27.9	-9.9	98.01	0.2	19.602
25-27.9	-2.9	8.41	0.5	4.205
35-27.9	7.1	50.41	0.2	10.082
48-27.9	20.1	404.01	0.1	<u>40.401</u>
				<u>74.29</u>

$$s_3 = \sqrt{74.29} = 8.619$$

Standard deviation about the expected value:

$$= \sqrt{\frac{85.4}{(1.06)^2} + \frac{98.61}{(1.06)^4} + \frac{74.29}{(1.06)^6}} = 14.3695$$

- (iii) Standard deviation is a statistical measure of dispersion; it measures the deviation from a central number i.e. the mean.

In the context of capital budgeting decisions especially where we take up two or more projects giving somewhat similar mean cash flows, by calculating standard deviation in such cases, we can measure in each case the extent of variation. It can

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then be used to identify which of the projects is least riskier in terms of variability of cash flows.

A project, which has a lower coefficient of variation will be preferred if sizes are heterogeneous.

Besides this, if we assume that probability distribution is approximately normal we are able to calculate the probability of a capital budgeting project generating a net present value less than or more than a specified amount.

Question 19

- (a) *Cyber Company is considering two mutually exclusive projects. Investment outlay of both the projects is Rs. 5,00,000 and each is expected to have a life of 5 years. Under three possible situations their annual cash flows and probabilities are as under:*

Situation	Probabilities	Cash Flow	
		Project A	Project B
Good	0.3	6,00,000	5,00,000
Normal	0.4	4,00,000	4,00,000
Worse	0.3	2,00,000	3,00,000

The cost of capital is 7 per cent, which project should be accepted? Explain with workings.

- (b) *A company is considering Projects X and Y with following information:*

Project	Expected NPV (Rs.)	Standard deviation
X	1,22,000	90,000
Y	2,25,000	1,20,000

- (i) *Which project will you recommend based on the above data?*
- (ii) *Explain whether your opinion will change, if you use coefficient of variation as a measure of risk.*
- (iii) *Which measure is more appropriate in this situation and why?*

Answer

(a) Project A

Expected Net Cash flow (ENCF)

$$.3 (6,00,000) + .4 (4,00,000) + .3 (2,00,000) = 4,00,000$$

$$\sigma^2 = .3 (6,00,000 - 4,00,000)^2 + .4 (4,00,000 - 4,00,000)^2 + .3 (2,00,000 - 4,00,000)^2$$

$$\sigma = \sqrt{24,00,00,00,000}$$

$$\sigma = 1,54,919.33$$

$$\text{ENPV} = 4,00,000 \times 4.100 = 16,40,000$$

$$\text{NPV} = 16,40,000 - 5,00,000 = 11,40,000$$

Project B

$$\text{ENCF} = .3 (5,00,000) + .4 (4,00,000) + .3 (3,00,000) = 4,00,000$$

$$\sigma^2 = .3 (5,00,000 - 4,00,000)^2 + .4 (4,00,000 - 4,00,000)^2 + .3 (3,00,000 - 4,00,000)^2$$

$$\sigma = \sqrt{6,00,00,00,000}$$

$$\sigma = 77,459.66$$

$$\text{ENPV} = 4,00,000 \times 4.100 = 16,40,000$$

$$\text{NPV} = 16,40,000 - 5,00,000 = 11,40,000$$

Recommendation:

NPV in both projects being the same, the project should be decided on the basis of standard deviation and hence project 'B' should be accepted having lower standard deviation, means less risky.

(b) (i) On the basis of standard deviation project X be chosen because it is less risky than Project Y having higher standard deviation.

$$(ii) \quad CV_x = \frac{SD}{ENPV} = \frac{90,000}{1,22,000} = .738$$

$$CV_y = \frac{1,20,000}{2,25,000} = .533$$

On the basis of Co-efficient of Variation (C.V.) Project X appears to be more risky and Y should be accepted.

(iii) However, the NPV method in such conflicting situation is best because the NPV method is in compatibility of the objective of wealth maximisation in terms of time value.

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Question 20

The Textile Manufacturing Company Ltd., is considering one of two mutually exclusive proposals, Projects M and N, which require cash outlays of Rs. 8,50,000 and Rs. 8,25,000 respectively. The certainty-equivalent (C.E) approach is used in incorporating risk in capital budgeting decisions. The current yield on government bonds is 6% and this is used as the risk free rate. The expected net cash flows and their certainty equivalents are as follows:

Year-end	Project M		Project N	
	Cash Flow Rs.	C.E.	Cash Flow Rs.	C.E.
1	4,50,000	0.8	4,50,000	0.9
2	5,00,000	0.7	4,50,000	0.8
3	5,00,000	0.5	5,00,000	0.7

Present value factors of Re. 1 discounted at 6% at the end of year 1, 2 and 3 are 0.943, 0.890 and 0.840 respectively.

Required:

- Which project should be accepted?
- If risk adjusted discount rate method is used, which project would be appraised with a higher rate and why?

Answer

- Statement Showing the Net Present Value of Project M

Year end	Cash Flow (Rs.) (a)	C.E. (b)	Adjusted Cash flow (Rs.) (c) = (a) × (b)	Present value factor at 6% (d)	Total Present value (Rs.) (e) = (c) × (d)
1	4,50,000	0.8	3,60,000	0.943	3,39,480
2	5,00,000	0.7	3,50,000	0.890	3,11,500
3	5,00,000	0.5	2,50,000	0.840	<u>2,10,000</u>
					8,60,980
					<u>8,50,000</u>
					Less: Initial Investment
					<u>10,980</u>
					Net Present Value
					<u>10,980</u>

Statement Showing the Net Present Value of Project N

Year end	Cash Flow (Rs.)	C.E.	Adjusted Cash flow (Rs.)	Present value factor	Total Present value (Rs.)
	(a)	(b)	(c) = (a) × (b)	(d)	(e) = (c) × (d)
1	4,50,000	0.9	4,05,000	0.943	3,81,915
2	4,50,000	0.8	3,60,000	0.890	3,20,400
3	5,00,000	0.7	3,50,000	0.840	<u>2,94,000</u>
					9,96,315
Less: Initial Investment				<u>8,25,000</u>	
Net Present Value				<u>1,71,315</u>	

Decision : Since the net present value of Project N is higher, so the project N should be accepted.

- (ii) Certainty - Equivalent (C.E.) Co-efficient of Project M (2.0) is lower than Project N (2.4). This means Project M is riskier than Project N as "higher the riskiness of a cash flow, the lower will be the CE factor". If risk adjusted discount rate (RADR) method is used, Project M would be analysed with a higher rate.

RADR is based on the premise that riskiness of a proposal may be taken care of, by adjusting the discount rate. The cash flows from a more risky proposal should be discounted at a relatively higher discount rate as compared to other proposals whose cash flows are less risky. Any investor is basically risk averse. However, he may be ready to take risk provided he is rewarded for undertaking risk by higher returns. So, more risky the investment is, the greater would be the expected return. The expected return is expressed in terms of discount rate which is also the minimum required rate of return generated by a proposal if it is to be accepted. Therefore, there is a positive correlation between risk of a proposal and the discount rate.

Question 21

A & Co. is contemplating whether to replace an existing machine or to spend money on overhauling it. A & Co. currently pays no taxes. The replacement machine costs Rs. 90,000 now and requires maintenance of Rs. 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of Rs. 20,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

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Year	Maintenance (Rs.)	Salvage (Rs.)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

The opportunity cost of capital for A & Co. is 15%.

Required:

When should the company replace the machine?

(Notes: Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269).

Answer

A & Co.

Equivalent cost of (EAC) of new machine

	Rs.
(i) Cost of new machine now	90,000
Add: p.v. of annual repairs @ Rs. 10,000 per annum for 8 years (Rs. 10,000 × 4.4873)	<u>44,873</u>
	<u>1,34,873</u>
Less: p.v. of salvage value at the end of 8 years (Rs. 20,000 × 0.3269)	6,538
	<u>1,28,335</u>
Equivalent annual cost (EAC) (Rs. 1,28,335/4.4873)	<u>28,600</u>

Equivalent Cost (EAC) of keeping the machine

Present value (p.v)	I Year (Rs.)	II Year (Rs.)	III Year (Rs.)	IV Year (Rs.)
Value Present	40,000	25,000	15,000	10,000
Add p.v. of annual maintenance (Annual Maintenance/1.15)	<u>8,696</u>	<u>17,391</u>	<u>26,087</u>	<u>34,783</u>

Total	48,696	42,391	41,087	44,783
Less: p.v. of salvage value at the end of the year (p.v. /1.15)	<u>21,739</u>	<u>13,043</u>	<u>8,696</u>	<u>Nil</u>
	26,957	29,348	32,391	44,783
	<u>1.15</u>	<u>1.15</u>	<u>1.15</u>	<u>1.15</u>
Equivalent Annual Cost (EAC)	<u>31,000</u>	<u>33,750</u>	<u>37,250</u>	<u>51,500</u>

Advice: The company should replace the old machine immediately because the Equivalent Annual Cost (EAC) of the new machine at Rs. 28,600 is lower than the cost of using the existing machine in first year, second year, third year and fourth year.

Question 22

A firm has an investment proposal, requiring an outlay of Rs. 80,000. The investment proposal is expected to have two years economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be Rs. 50,000 and 0.6 probability that cash inflow after tax will be Rs. 60,000. The probability assigned to cash inflow after tax for the year 2 is as follows:

The cash inflow year 1	Rs. 50,000	Rs. 60,000
The cash inflow year 2	Probability	Probability
	Rs. 24,000 0.2	Rs. 40,000 0.4
	Rs. 32,000 0.3	Rs. 50,000 0.5
	Rs. 44,000 0.5	Rs. 60,000 0.1

The firm uses a 10% discount rate for this type of investment.

Required:

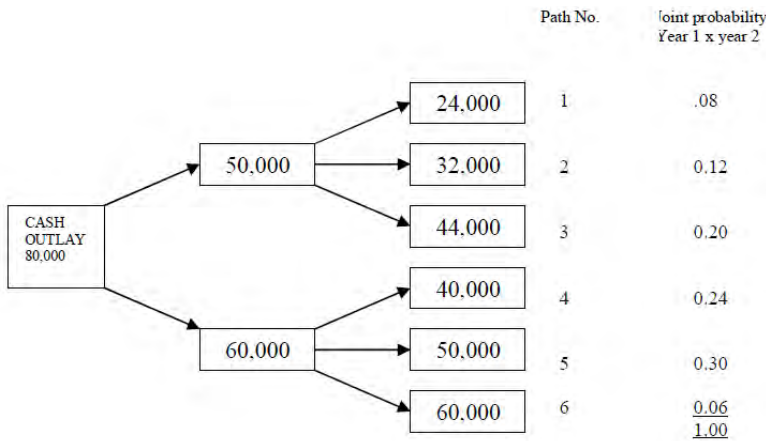
- (i) Construct a decision tree for the proposed investment project and calculate the expected net present value (NPV).
- (ii) What net present value will the project yield, if worst outcome is realized? What is the probability of occurrence of this NPV?
- (iii) What will be the best outcome and the probability of that occurrence?
- (iv) Will the project be accepted?

(Note: 10% discount factor 1 year 0.909; 2 year 0.826)

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Answer

- (i) The decision tree diagram is presented in the chart, identifying various paths and outcomes, and the computation of various paths/outcomes and NPV of each path are presented in the following tables:



The Net Present Value (NPV) of each path at 10% discount rate is given below:

Path	Year 1 Cash Flows (Rs.)	Year 2 Cash Flows (Rs.)	Total Cash Inflows (PV) (Rs.)	Cash Inflows (Rs.)	NPV (Rs.)
1	50,000' .909 = 45,450	24,000' .826 = 19,824	65,274	80,000	(—) 14,726
2	45,450	32,000' .826 = 26,432	71,882	80,000	(—) 8,118
3	45,450	44,000' .826 = 36,344	81,794	80,000	1,794
4	60,000' .909 = 54,540	40,000' .826 = 33,040	87,580	80,000	7,580
5	54,540	50,000' .826 = 41,300	95,840	80,000	15,840
6	54,540	60,000' .826 = 49,560	1,04,100	80,000	24,100

Statement showing Expected Net Present Value

			Rs.
<i>z</i>	<i>NPV(Rs.)</i>	<i>Joint Probability</i>	<i>Expected NPV</i>
1	−14,726	0.08	−1,178.08
2	−8,118	0.12	−974.16
3	1,794	0.20	358.80
4	7,580	0.24	1,819.20
5	15,840	0.30	4,752.00
6	24,100	0.06	<u>1,446.00</u>
			<u>6,223.76</u>

Conclusions:

- (ii) If the worst outcome is realized the project will yield NPV of − Rs. 14,726. The probability of occurrence of this NPV is 8% and a loss of Rs. 1,178 (path 1).
- (iii) The best outcome will be path 5 when the NPV is at Rs. 15,840. The probability of occurrence of this NPV is 30% and a expected profit of Rs. 4,752.
- (iv) The project should be accepted because the expected NPV is positive at Rs. 6,223.76 based on joint probability.

Question 23

You own an unused Gold mine that will cost Rs. 10,00,000 to reopen. If you open the mine, you expect to be able to extract 1,000 ounces of Gold a year for each of three years. After that the deposit will be exhausted. The Gold price is currently Rs. 5,000 an ounce, and each year the price is equally likely to rise or fall by Rs. 500 from its level at the start of year. The extraction cost is Rs.4,600 an ounce and the discount rate is 10 per cent.

Required:

- (a) Should you open the mine now or delay one year in the hope of a rise in the Gold price?
- (b) What difference would it make to your decision if you could costlessly (but irreversibly) shut down the mine at any stage? Show the value of abandonment option.

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Answer

- (a) (i) Assume we open the mine now at $t = 0$. Taking into account the distribution of possible future price of gold over the next three years, we have

$$\begin{aligned}
 NPV &= -Rs.10,00,000 + \frac{1,000 \times [0.5 \times 5,500 + 0.5 \times 4,500] - 4,600}{1.10} \\
 &+ \frac{1,000 \times [(0.5)^2 (6,000 + 5,000 + 5,000 + 4,000) - 4,600]}{(1.10)^2} \\
 &+ \frac{1,000 \times [(0.5)^3 (6,500 + 5,500 + 5,500 + 4,500 + 4,500 + 5,500 + 4,500 + 3,500) - 4,600]}{(1.10)^3} \\
 &= -Rs. 5,260
 \end{aligned}$$

Because the NPV is negative, we should not open the mine at $t = 0$. It does not make sense to open the mine at any price less than or equal to Rs. 5,000 per ounce.

- (ii) Assume that we delay one year until $t = 1$, and open the mine if the price is Rs. 5,500.

At that point:

$$NPV = -Rs.10,00,000 + \sum_{t=1}^3 \frac{(1,000) \times (5,500 - 4,600)}{(1.10)^t} = Rs.12,38,167$$

If the price at t_1 reaches Rs. 5,500, then expected price for all future periods is Rs. 5,500.

$$NPV \text{ at } t_0 = Rs. 12,38,167 / 1.10 = Rs. 11,25,606$$

If the price rises to Rs. 5,500 at $t = 1$, we should open the mine at that time.

The expected NPV of this strategy is:

$$(0.50 \times Rs. 11,25,606) + (0.50 \times 0) = Rs. 5,62,803$$

As already stated mine should not be open ed if the price is less than or equal to Rs. 5,000 per ounce.

If the price at t_1 reaches Rs. 4,500, then expected price for all future periods is Rs. 4,500. In that situation we should not open the mine.

- (b) Suppose we open the mine at $t = 0$, when the price is Rs. 5,000. At $t = 2$, there is a 0.25 probability that the price will be Rs. 4,000. Then since the price at $t = 3$ cannot rise above the extraction cost, the mine should be closed. If we open the mine at $t = 0$, when the price was Rs.5,000 with the closing option the NPV will be:

$$\begin{aligned}
 \text{NPV} &= -\text{Rs. } 10,00,000 + \sum_{t=1}^2 \frac{(5,000 - 4,600) \times 1,000}{(1.10)^t} \\
 &+ \frac{.125 \times [1,900 + 900 + 900 + 900 - 100 - 100] \times 1,000}{(1.10)^3} \\
 &= \text{Rs. } 1,07,438
 \end{aligned}$$

Therefore, the NPV with the abandonment option is Rs. 1,07,438.

The value of the abandonment option is:

$$0.25 \times 1,000 \times (600) / (1.10)^3 = \text{Rs. } 1,12,697$$

The NPV of strategy (2), that to open the mine at $t = 1$, when price rises to Rs. 5,500 per ounce, even without abandonment option, is higher than option 1. Therefore, the strategy (2) is preferable.

Under strategy 2, the mine should be closed if the price reaches Rs. 4,500 at $t = 3$, because the expected profit is $(\text{Rs. } 4,500 - 4,600) \times 1,000 = -\text{Rs. } 1,00,000$.

The value of the abandonment option is:

$$0.125 \times (1,00,000) / (1.10)^4 = \text{Rs. } 8,538$$

Note: Students may also assume that the price of the gold remains at Rs. 5,000 to solve the question.

Question 24

A firm has projected the following cash flows from a project under evaluation:

Year	Rs. lakhs
0	(70)
1	30
2	40
3	30

The above cash flows have been made at expected prices after recognizing inflation. The firm's cost of capital is 10%. The expected annual rate of inflation is 5%.

Show how the viability of the project is to be evaluated.

Strategic Financial Management

Answer

It is stated that the cash flows have been adjusted for inflation; hence they are “nominal”. The cost of capital or discount rate is “real”. In order to be compatible, the cash flows should be converted into “real flow”. This is done as below:

Year	Nominal cash flows	Adjusted Inflation* factor	Real cash flows	PVF @ 10%	PV of cash flows
0	(70)	-	(70)	1.000	(70)
1	30	0.952	28.56	0.909	25.96
2	40	0.907	36.28	0.826	29.97
3	30	0.864	25.92	0.751	19.47
				Total	75.40
				Less: Cash out flow	<u>70.00</u>
				NPV (+)	<u>5.40</u>

* $1/1.05$; $1/(1.05)^2$; $1/(1.05)^3$;

Advise: With positive NPV, the project is financially viable.

Alternatively, instead of converting cash flows into real terms, the discount rate can be converted into nominal rate. Result will be the same.

An alternative solution is presented herewith

Alternative solution:

Year	Nominal cash flows	PVF @ 10% adjusted by the inflation factor i.e. 5%*	PV of cash flows
0	(70)	1.000	(70)
1	30	0.866	25.98
2	40	0.749	29.96
3	30	0.649	<u>19.47</u>
		Cash inflow	75.41
		Less: Cash out flow	<u>70.00</u>
		Net present value	<u>5.41</u>

* $\frac{0.909}{1.05} = 0.866$, $\frac{0.826}{1.1025} = 0.749$, $\frac{0.751}{1.1576} = 0.649$

Advise: With positive NPV, the project is financially viable.

Question 25

Project X and Project Y are under the evaluation of XY Co. The estimated cash flows and their probabilities are as below:

Project X : Investment (year 0) Rs. 70 lakhs

Probability weights	0.30	0.40	0.30
Years	Rs. lakhs	Rs. lakhs	Rs. lakhs
1	30	50	65
2	30	40	55
3	30	40	45

Project Y: Investment (year 0) Rs. 80 lakhs.

Probability weighted	Annual cash flows through life
	Rs. lakhs
0.20	40
0.50	45
0.30	50

- (a) Which project is better based on NPV, criterion with a discount rate of 10%?
- (b) Compute the standard deviation of the present value distribution and analyse the inherent risk of the projects.

Answer

Calculation of NPV xy Co.:

	Project X	Cash flow	PVF	PV
Year				
1	$(30 \times 0.3) + (50 \times 0.4) + (65 \times 0.3)$	48.5	0.909	44.09
2	$(30 \times 0.3) + (40 \times 0.4) + (55 \times 0.3)$	41.5	0.826	34.28
3	$(30 \times 0.3) + (40 \times 0.4) + (45 \times 0.3)$	38.5	0.751	<u>28.91</u>
				<u>107.28</u>
	NPV: $(107.28 - 70.00) =$			(+) 37.28

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Project Y

$$1-3 \quad (40 \times 0.2) + (45 \times 0.5) + (50 \times 0.3) \quad 45.5 \quad 2.486 \quad \underline{113.11}$$
$$\text{NPV } (113.11 - 80.00) \quad (+) \underline{33.11}$$

(b) Calculation of Standard deviation s

Project X

Year

$$\begin{array}{ll} 1 & \sqrt{((30 - 48.5)^2 + (50 - 48.5)^2 + (65 - 48.5)^2)} \quad 24.83 \\ 2 & \sqrt{((30 - 41.5)^2 + (40 - 41.5)^2 + (55 - 41.5)^2)} \quad 17.80 \\ 3 & \sqrt{((30 - 38.5)^2 + (40 - 38.5)^2 + (45 - 38.5)^2)} \quad 10.81 \end{array}$$

Project Y

$$\sqrt{(40 - 45.5)^2 + (45 - 45.5)^2 + (50 - 45.5)^2} \quad 7.12$$

As per Hillier's model

$$M = \sum_{i=0}^n (1+r)^{-i} M_i$$

$$s^2 = \sum_{i=0}^n (1+r)^{-2i} s_i^2$$

Hence

Project X

Year	$(1+r)^{-2i}$	s^2	
0	1.00	4,900	4,900
1	0.83	617	512
2	0.69	317	219
3	0.56	117	<u>66</u>
			<u>5,697</u>

Standard deviation = $\sqrt{5,697} = 75.48$

Project Y

Year			
0	1.00	6,400	6,400
1	0.83	51	42
2	0.69	51	35
3	0.56	51	<u>29</u>
			<u>6,506</u>

Standard deviation = $\sqrt{6,506} = 80.66$

Analysis:

Project X is recommended because of higher NPV and lower standard deviation (risk of variability)

Question 26

Determine the risk adjusted net present value of the following projects:

	X	Y	Z
Net cash outlays (Rs.)	2,10,000	1,20,000	1,00,000
Project life	5 years	5 years	5 years
Annual Cash inflow (Rs.)	70,000	42,000	30,000
Coefficient of variation	1.2	0.8	0.4

The Company selects the risk-adjusted rate of discount on the basis of the coefficient of variation:

Coefficient of Variation	Risk-Adjusted Rate of Return	P.V. Factor 1 to 5 years At risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

Strategic Financial Management

Answer

Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years	Discounted cash inflow	Net present value
	Rs.			Rs.		Rs.	Rs.
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii) = (v) × (vi)	(viii) = (vii) - (ii)
X	2,10,000	1.20	16%	70,000	3.274	2,29,180	19,180
Y	1,20,000	0.80	14%	42,000	3.433	1,44,186	24,186
Z	1,00,000	0.40	12%	30,000	3.605	1,08,150	8,150

Question 27

Following are the estimates of the net cash flows and probability of a new project of M/s X Ltd.:

	Year	P=0.3	P=0.5	P=0.2
Initial investment	0	4,00,000	4,00,000	4,00,000
Estimated net after tax cash inflows per year	1 to 5	1,00,000	1,10,000	1,20,000
Estimated salvage value (after tax)	5	20,000	50,000	60,000

Required rate of return from the project is 10%. Find:

- The expected NPV of the project.
- The best case and the worst case NPVs.
- The probability of occurrence of the worst case if the cash flows are perfectly dependent overtime independent overtime.
- Standard deviation and coefficient of variation assuming that there are only three streams of cash flow, which are represented by each column of the table with the given probabilities.
- Coefficient of variation of X Ltd. on its average project which is in the range of 0.95 to 1.0. If the coefficient of variation of the project is found to be less risky than average, 100 basis points are deducted from the Company's cost of Capital

Should the project be accepted by X Ltd?

Answer

(a) (i) Expected cash flows:-

Year			Net cash flows	P.V.	PV. @ 10%
0	(4,00,000 x 1)	=	(-)4,00,000	1.000	(-)4,00,000
1 to 4	(1,00,000x03+1,10,000x0.5 + 1,20,000 x 0.2)	=	1,09,000	3.169	3,45,421
5	[1,09,000 + (20,000 x 0.3 + 50,000 x 0.5 + 60,000 x 0.2)]	=	1,52,000	0.621	94,392
NPV=					39,813

(ii) ENPV of the worst case

1,00,000 x 3.790 = Rs.3,79,000 (Students may have 3.791 also the values will change accordingly)

20,000 x 0.621 = Rs.12,420/-

ENPV = (-)4,00,000 + 3,79,000 + 12,420 = (-)Rs.8,580/-

ENPV of the best case

ENPV = (-)4,00,000 + 1,20,000 x 3.79 + 60,000 x 0.621 = Rs.92,060/-.

(iii) (a) Required probability = 0.3

(b) Required probability = $(0.3)^5 = 0.00243$

(iv) The base case NPV = (-)4,00,000 + (1,10,000 x 3.79) + (50,000 x 0.621)
= Rs.47,950/-

ENPV = 0.30 x (-) 8580 + 0.5 x 47950 + 92060 x 0.20
= Rs.39,813/-

Therefore,

$$s\text{ENPV} = \sqrt{0.3(-8580 - 39,813)^2 + 0.5(47950 - 39,813)^2 + 0.2(92,060 - 39,813)^2}$$

$$= \text{Rs.}35,800/-$$

Therefore, CV = 35,800/39,813 = 0.90

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- (v) Risk adjusted out of cost of capital of X Ltd. =
- $10\% - 1\% = 9\%$
- .

NPV

Year	Expected net cash flow	PV @ 9%	
0	(-)4,00,000	1.000	(-)4,00,000
1 to 4	1,09,000	3.239	3,53,051
5	1,52,000	0.650	<u>98,800</u>
		ENPV =	<u>51,851</u>

Therefore, the project should be accepted.

Question 28

ABC Ltd. is considering a project in US, which will involve an initial investment of US \$ 1,10,00,000. The project will have 5 years of life. Current spot exchange rate is Rs.48 per US \$. The risk free rate in US is 8% and the same in India is 12%. Cash inflow from the project is as follows:

Year	Cash inflow
1	US \$ 20,00,000
2	US \$ 25,00,000
3	US \$ 30,00,000
4	US \$ 40,00,000
5	US \$ 50,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

Answer

$$(1 + 0.12) (1 + \text{Risk Premium}) = (1 + 0.14)$$

$$\text{Or, } 1 + \text{Risk Premium} = 1.14/1.12 = 1.0179$$

Therefore, Risk adjusted dollar rate is = $1.0179 \times 1.08 = 1.099 - 1 = 0.099$

Calculation of NPV

<i>Year</i>	<i>Cash flow (Million)</i>	<i>PV Factor at 9.9%</i>	<i>P.V.</i>
	<i>US\$</i>		
1	2.00	0.910	1.820
2	2.50	0.828	2.070
3	3.00	0.753	2.259
4	4.00	0.686	2.744
5	5.00	0.624	<u>3.120</u>
			12.013
		Less: Investment	<u>11.000</u>
		NPV	<u>1.013</u>

Therefore, Rupee NPV of the project is = Rs. (48 x 1.013) Million

= Rs.48.624 Million

Question 29

XYZ Ltd. is considering a project for which the following estimates are available:

	<i>Rs.</i>
<i>Initial Cost of the project</i>	10,00,000
<i>Sales price/unit</i>	60
<i>Cost/unit</i>	40
<i>Sales volumes</i>	
<i>Year 1</i>	20000 units
<i>Year 2</i>	30000 units
<i>Year 3</i>	30000 units

Discount rate is 10% p.a.

You are required to measure the sensitivity of the project in relation to each of the following parameters:

- (a) Sales Price/unit
- (b) Unit cost

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- (c) Sales volume
(d) Initial outlay and
(e) Project lifetime

Taxation may be ignored.

Answer

Calculation of NPV

$$\begin{aligned}\text{NPV} &= -10,00,000 + \frac{20,000 \times 20}{1.1} + \frac{30,000 \times 20}{1.21} + \frac{30,000 \times 20}{1.331} \\ &= -10,00,000 + 3,63,636 + 4,95,868 + 4,50,789 \\ &= 13,10,293 - 10,00,000 \\ &= \text{Rs. } 3,10,293/-\end{aligned}$$

Measurement of sensitivity is as follows:

- (a) Sales Price:-

Let the sale price/Unit be S so that the project would break even with 0 NPV.

$$\begin{aligned}-10,00,000 &= \frac{20,000 \times (S - 40)}{1.1} + \frac{30,000 \times (S - 40)}{1.21} + \frac{30,000 \times (S - 40)}{1.331} \\ S - 40 &= 10,00,000 / 65,512 \\ &= \text{Rs. } 15.26 \\ S &= \text{Rs. } 55.26 \text{ which represents a fall of } (60 - 55.26) / 60 \\ &\quad \text{Or } 0.079 \text{ or } 7.9\%\end{aligned}$$

Alternative Method

$$\frac{10,00,000 \times 20}{13,10,293} = \text{Rs. } 15.26$$

$$\begin{aligned}S &= \text{Rs. } 40 + \text{Rs. } 15.26 \\ &= \text{Rs. } 55.26\end{aligned}$$

- (b) Unit Cost:-

If sales price = Rs. 60 the cost price required to give a margin of Rs.15.26 is (Rs.60 - Rs.15.26) or Rs.44.74 which would represent a rise of 11.85%

$$\text{i.e., } \frac{44.74 - 40}{40} \times 100 = 11.85\%$$

(c) Sales volume:-

The requisite percentage fall is:-

$$3,10,293/13,10,293 \times 100 = 23.68\%$$

(d) Since PV of inflows remains at Rs.13,10,293 the initial outlay must also be the same.

$$\backslash \quad \text{Percentage rise} = 3,10,293/10,00,000 \times 100 = 31.03\%.$$

(e) Present value for 1st two years.

$$= -10,00,000 + 4,00,000 \times 0.909 + 6,00,000 \times 0.826$$

$$= -10,00,000 + 3,63,600 + 4,95,600$$

$$= -10,00,000 + 8,59,200$$

$$= -1,40,800$$

\quad The project needs to run for some part of the third year so that the present value of return is Rs.1,40,800. Let us consider that fraction of the year be x.

$$\backslash \quad 6,00,000 \times (1.1)^{2+x} = 1,40,800$$

Putting x = 0.2 in above equation the present value of the return is Rs. 97,301.

Putting x = 0.3 the present value becomes Rs.1,44,578.

By interpolating we get X = 0.292

Thus, if the project runs for 2.292 years then break even would be achieved.

Note: The above calculation may also be made as follows:

$$(i) \quad = 30,000 \text{ units} \times \text{Rs.}20 \times 0.751 = \text{Rs.}4,50,600$$

(ii) Per day Production in (Rs.) assuming a year of 360 days =

$$\frac{\text{Rs.}4,50,600}{360} = \text{Rs.}1,252$$

$$(iii) \quad \text{Days needed to recover Rs.}1,40,800 = \frac{\text{Rs.}1,40,800}{\text{Rs.}1,252} = 112$$

Thus, if the project runs for 2 years and 112 days then break even would be achieved.

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Question 30

ABC Co. is considering a new sales strategy that will be valid for the next 4 years. They want to know the value of the new strategy. Following information relating to the year which has just ended, is available:

<i>Income Statement</i>	<i>Rs.</i>
Sales	20,000
Gross margin (20%)	4,000
Administration, Selling & distribution expense (10%)	2,000
PBT	2,000
Tax (30%)	600
PAT	1,400
<i>Balance Sheet Information</i>	
Fixed Assets	8,000
Current Assets	4,000
Equity	12,000

If it adopts the new strategy, sales will grow at the rate of 20% per year for three years. The gross margin ratio, Assets turnover ratio, the Capital structure and the income tax rate will remain unchanged.

Depreciation would be at 10% of net fixed assets at the beginning of the year.

The Company's target rate of return is 15%.

Determine the incremental value due to adoption of the strategy.

Answer

Projected Balance Sheet

	Year 1	Year 2	Year 3	Year 4
Fixed Assets (40%) of Sales	9,600	11,520	13,824	13,824
Current Assets (20%) of Sales	4,800	5,760	6,912	6,912
Total Assets	14,400	17,280	20,736	20,736
Equity	14,400	17,280	20,736	20,736

Projected Cash Flows:-

	Year 1	Year 2	Year 3	Year 4
Sales	24,000	28,800	34,560	34,560
PBT (10%) of sale	2,400	2,880	3,456	3,456
PAT (70%)	1,680	2,016	2,419.20	2,419.20
Depreciation	800	960	1,152	1,382
Addition to Fixed Assets	2,400	2,880	3,456	1,382
Increase in Current Assets	800	960	1,152	-
Operating cash flow	(720)	(864)	(1,036.80)	2,419.20

Present value of Projected Cash Flows:-

Cash Flows	PV at 15%	PV
-720	0.870	-626.40
-864	0.756	-653.18
-1,036.80	0.658	<u>-682.21</u>
		-1,961.79

Residual Value	-	$2419.20/0.15 = 16,128$	
Present value of Residual value	=	$16128/(1.15)^3$	
	=	$16128/1.521 = 10603.55$	
Total shareholders' value	=	$10,603.55 - 1,961.79 =$	8,641.76
Pre strategy value	=	$1,400 / 0.15 = 9,333.33$	
\ Value of strategy	=	$8,641.76 - 9,333.33 =$	691.57

Conclusion: The strategy is not financially viable

Question 31

XY Ltd. which is specialized in manufacturing garments is planning for expansion to handle a new contract which it expects to obtain. An investment bank have approached the company and asked whether the Co. had considered venture Capital financing. In 2001, the company borrowed Rs.100 lacs on which interest is paid at 10% p.a. The Company shares are unquoted and it has decided to take your advice in regard to the calculation of value of the Company that could be used in negotiations using the following available information and forecast.

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Company's forecast turnover for the year to 31st March, 2005 is Rs.2,000 lacs which is mainly dependent on the ability of the Company to obtain the new contract, the chance for which is 60%, turnover for the following year is dependent to some extent on the outcome of the year to 31st March, 2005. Following are the estimated turnovers and probabilities:

Year - 2005		Year – 2006	
Turnover	Prob.	Turnover	Prob.
Rs. (in lacs)		Rs.(in lacs)	
2,000	0.6	2,500	0.7
		3,000	0.3
1,500	0.3	2,000	0.5
		1,800	0.5
1,200	0.1	1,500	0.6
		1,200	0.4

Operating costs inclusive of depreciation are expected to be 40% and 35% of turnover respectively for the years 31st March, 2005 and 2006. Tax is to be paid at 30%. It is assumed that profits after interest and taxes are free cash flows. Growth in earnings is expected to be 40% for the years 2007, 2008 and 2009 which will fall to 10% each year after that. Industry average cost of equity (net of tax) is 15%.

Answer

Estimation of earnings for the years ended 31st March, 2005 & 2006

(Rs. In lacs)					
Prob.	Turnover	Expected Turnover	Prob.	Turnover	Expected Turnover
0.6	2000	1200	0.6 x 0.7	2500	1050
			0.6 x 0.3	3000	540
0.3	1500	450	0.3 x 0.5	2000	300
			0.3 x 0.5	1800	270
0.1	1200	120	0.1 x 0.6	1500	90
			0.1 x 0.4	1200	48
		<u>1770</u>			<u>2298</u>
Operating Costs (40%)		(708)	(35%)		(804)

Interest 100 x 1	(10)	(10)
Profit after Interest	1052	1484
Tax	316	445
Earnings/Cash flows	736	1039

Estimated Cash flows for 2007 2008 & 2009:-

(Rs. In Lacs)

2007 -	1039 x 1.4 = 1455
2008 -	1455 x 1.4 = 2037
2009 -	2037 x 1.4 = 2852

Discounted Cash flows for the year 2005-2009

(Rs. in Lacs)

Year		Cash flows	Disc. Factor at 15%	PV
2005	-	736	0.870	640
2006	-	1039	0.756	785
2007	-	1455	0.658	957
2008	-	2037	0.572	1165
2009	-	2852	0.497	<u>1417</u>
				<u>4964</u>

Estimates of value of Cash flows from 2010 to infinity

Earnings in 2010	-	2852 x 1.1 = 3137
In today's money	-	3137 x 0.497 = 1559

$$P_0 = D_1 / (K_e - G)$$

$$= 1559 / (0.15 - 0.10) = 31180 \text{ Rs. Lacs}$$

Present value of all future estimated cash flows:-

2005 - 2009	-	4964
2009 onwards	-	<u>31180</u>
		<u>36144</u>

\ Company valuation is 36144 Rs. Lacs

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Question 32

A USA based company is planning to set up a software development unit in India. Software developed at the Indian unit will be bought back by the US parent at a transfer price of US \$10 millions. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The US based company will be subject to corporate tax of 30 per cent and a withholding tax of 10 per cent in India and will not be eligible for tax credit in the US. The software developed will be sold in the US market for US \$ 12.0 millions. Other estimates are as follows:

Rent for fully furnished unit with necessary hardware in India Rs.15,00,000

Man power cost (80 software professional will be working for 10 hours each day) Rs.400 per man hour

Administrative and other costs Rs.12,00,000

Advise the US Company on the financial viability of the project. The rupee-dollar rate is Rs.48/\$.

Answer

Proforma profit and loss account of the Indian software development unit

	Rs.	Rs.
Revenue		48,00,00,000
Less: Costs:		
Rent	15,00,000	
Manpower (Rs.400 x 80 x 10 x 365)	11,68,00,000	
Administrative and other costs	12,00,000	11,95,00,000
Earnings before tax		36,05,00,000
Less: Tax		10,81,50,000
Earnings after tax		25,23,50,000
Less: Withholding tax(TDS)		2,52,35,000
Repatriation amount (in rupees)		22,71,15,000
Repatriation amount (in dollars)		\$4.7 million

Note: Students may assume the year of 360 days instead of 365 days as has been done in the answer provided above. In such a case where a year is assumed to be of 360 days, manpower cost is Rs 11,52,00,000 and repatriated amount Rs 22,87,15,000.

Advise: The cost of development software in India for the US based company is \$5.268 million. As the USA based Company is expected to sell the software in the US at \$12.0 million, it is advised to develop the software in India.

Question 33

DL Services is in the business of providing home Services like plumbing, sewerage line cleaning etc. There is a proposal before the company to purchase a mechanized sewerage cleaning line for a sum of Rs. 20 lacs. The life of the machine is 10 years. The present system of the company is to use manual labour for the job. You are provided the following information:

<i>Cost of machine</i>	<i>20 lakhs</i>
<i>Depreciation</i>	<i>20% p.a. straight line</i>
<i>Operating cost</i>	<i>Rs. 5 lacs per annum</i>
<i>Present system</i>	
<i>Manual labour</i>	<i>200 persons</i>
<i>Cost of Manual labour</i>	<i>Rs. 10,000 (ten thousand) per person per annum</i>

The company has an after tax cost of funds of 10% per annum. The applicable rate of tax inclusive of surcharge and cess is 35%.

Based on the above you are required to:

- (i) State whether it is advisable to purchase the machine.*
- (ii) Compute the savings/additional cost as applicable, if the machine is purchased.*

Answer

Present System

<i>Cost per annum</i>	
<i>200 persons @ Rs.10,000 per annum</i>	<i>20,00,000</i>
<i>Cumulative Annuity factor at 10%</i>	<i>6.1446</i>
<i>Present value of cash outflow over a period of ten years at 10%</i>	<i>122,89,200</i>
<i>Tax benefit at 35% for 10 years</i>	<i>43,01,220</i>
<i>Net cost over ten years</i>	<i>79,87,980</i>

If machine is purchased

<i>Cost of Machine</i>	<i>20,00,000</i>
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Strategic Financial Management

Depreciation per annum	4,00,000
Annual cost of operation	5,00,000
Present value of operating cost for 10 years at 10%	30,72,300
Tax saving on operating cost at 35% for 10 years	10,75,305
Net operating cost	19,96,995
Annuity factor for 5 years at 10%	3.7908
Tax saving on depreciation at 35%	5,30,712
Summary	
Outflow on machine	20,00,000
Less: Tax saving on depreciation of Machine	-5,30,712
Add: Operating cost over 10 years	19,96,995
Total cost of machine over 10 years	34,66,283
Total saving	45,21,697

Since there is a saving of Rs.45.21 lacs it is advisable to purchase the machine.

Alternative Solution:

Calculation of Savings in operating cost if the mechanized cleaning line is purchased:

Annual Cost of the present system – cost of manual labour	Rs. lakhs
200 persons × Rs.10,000	20.00
Less: Operating cost with the new line	5.00
Annual Savings	15.00

Calculation of incremental cash inflows if the mechanized cleaning line is purchased:

Year 1 - 5

	Rs. lakhs
Annual Savings in operating cost (before tax)	15.00
Less: Annual depreciation @ 20% on cost	4.00
Taxable annual incremental income	11.00
Less: Tax @ 35%	3.85
After-tax annual incremental income	7.15
Add: Annual depreciation	4.00

Annual incremental cash-in-flow	11.15
Present Value Factor (of an Annuity for a period of 5 years @ 10%)	3.79
	(Rs. Lakhs)
Present Value of 5-year annual incremental cash-in-flow	42.26
Year 6 – 10	
Annual Savings in operating cost (before tax)	15.00
Less: Tax @ 35%	5.25
After-tax annual incremental income/cash in flow	9.75
Present Value Factor (of an Annuity between year 6 and 10)	2.35
Present Value of cash-in-flow in years 6 to 10	(Rs. Lakhs) 22.91
(Salvage value presumed 'nil')	

Rs. in lakhs

Calculation of Net Present Value:

Aggregate Present Value of Cash inflows in years 1 – 10	
(42.26 + 22.91)	65.17
Less: Initial investment – cost of machine	20.00
Net Present Value	(+) 45.17

Advise: Since the NPV is positive, it is advisable to purchase the mechanized line.

Question 34

The Mayfair Rubber Industry Ltd. (MRIL) manufactures mall rubber components for the local market. It is presently using 8 machines which were acquired 3 years ago at a cost of Rs.18 lakhs each having a useful life of 8 years with no salvage value. The policy of the company is to depreciate all machines in 5 years. Their production capacity is 37 lakhs units while the annual demand is 30 lakhs units. The MRIL has received an order from a leading automobile company of Singapore for the supply of 20 lakhs rubber bushes at Rs.15 per unit. The existing machines can be sold @Rs.12 lakhs per machine. It is estimated that the removal cost of each machine would be Rs.60,000. In order to meet the increased demand, the MRIL can acquire 3 new machines at an estimated cost of Rs.100 lakhs each which will have a combined production capacity of 52 lakhs units.

The operating parameters of the existing machines are as follows:

- (i) *Labour requirements (Unskilled-18; skilled-18; Supervisor-3; and Maintenance-2) and their per month salaries are Rs.3,500; Rs.5,500; Rs.6,500 and Rs.5,000 each respectively with an increase of 10 percent to adjust inflation.*

Strategic Financial Management

- (ii) Raw material cost, inclusive of wastage is 60 per cent of revenues.
- (iii) Maintenance cost – years 1-5 (Rs.22.5 lakh), and years 6-8 (Rs.67.5) lakh).
- (iv) Operating expenses – Rs.52.10 lakh expected to increase annually by 5 percent.
- (v) Insurance cost/premium – year 1,2 percent of the original cost of the machine, afterwards discounted by 10 percent.
- (vi) Selling Price – Rs.15 per unit.

The projected operating parameters with the replacement by the new machines are as follows :

- (i) Additional working capital – Rs.50 lakh.
- (ii) Savings in cost of utilities – Rs.2.5 lakh.
- (iii) Maintenance cost – years 1-2 (Rs.7.5 lakh); years 3-5 (Rs.37.5 lakh).
- (iv) Raw materials cost – 55 percent of sales.
- (v) Employee requirement (6 skilled at monthly salary of Rs.7,000 each and one for maintenance at monthly salary of Rs.6,500).
- (vi) Laying off cost of 34 workers – (Unskilled-18; Skilled-12;; Supervisors-3; and maintenance-1) Rs.9,21,000, that is equivalent to six months' salary.
- (vii) Insurance cost/premium-2 percent of the Purchase cost of machine in the first year and discounted by 10 percent in subsequent years.
- (viii) Live of machines – 5 years and salvage value – Rs.10 lakh per machine.

The company follows straight line method of depreciation and the same is accepted for tax purposes. Corporate tax rate is 35 percent and the cost of capital is 20 percent.

As the Finance Manager of MRIL, prepare a report for submission to the top management with your recommendations about the financial viability of the replacement of the existing machine.

Answer

Incremental CFAT and NPV

(Rs. in lakhs)

Particulars	1	2	3	4	5
Sales	300	300	300	300	300
Add: Cost Savings:					
Maintenance (note 2)	15	15	30	30	30
Cost of utilities	2.5	2.5	2.5	2.5	2.5
Labour Costs (note 3)	17.16	18.87	20.76	22.84	25.12

Less: Incremental cost

Raw materials (note 4)	142.5	142.5	142.5	142.5	142.5
Depreciation (note 5)	25.2	25.2	54	54	54
Insurance (note 6)	4.12	3.71	3.34	3	2.71
Earnings before Tax	163.04	165.16	153.42	155.84	158.76
<i>Less: Taxes (0.35)</i>	57.064	57.806	53.607	54.544	55.426
Earnings after taxes	105.976	107.354	99.723	101.296	102.934
CFAT (EAT + Depreciation)	130.976	132.354	153.723	155.296	156.934
Salvage Value					30
Release of working capital					50
(x) PV factor at .20	0.833	0.694	0.579	0.482	0.402
PV	109.10	91.85	89.01	74.85	95.25
Total present value (t = 1-5)					460.06
<i>Less: cash Outflow</i>					276.55
<i>NPV</i>					183.51

Advise: Since the NPV is positive, replacement of the exiting machines is financially viable.

Financial Analysis Whether to Replace the Existing Machines (Using NPV Method)

Incremental cash outflows:

Cost of 3 new machines (Rs.100 lakh × 3)	300,00,000
Additional working capital	50,00,000
<i>Less: Sale proceeds of existing machines</i>	96,00,000
<i>Add: Removal cost of existing machines</i>	4,80,000
Tax on profit on sale of machine (working note1)	11,76,000
Cost of laying off 34 workers (Rs.921000 tax advantage @ .35 i.e. to Rs.3,22,350)	5,98,650
	2,76,54,650

Strategic Financial Management

Working Notes:

1. Tax on profit on sale of existing machine:

Sale proceeds of existing machine:		96,00,000
	(8 × 12,00,000)	
Less: Book value	(Rs.18 lakh × 8 – Original Cost accumulated depreciation 28.80 × 3)	<u>57,60,000</u>
	Gross profit	38,40,000
Less: Removal Cost	(60,000 × 8)	<u>4,80,000</u>
	Net Profit	33,60,000
	Tax rate	0.35
	Taxes payable on profit	<u>11,76,000</u>

2. Saving in Maintenance cost:

	(Rs. in lakhs)				
Year	1	2	3	4	5
Old Machine	22.5	22.5	67.5	67.5	67.5
New Machine	7.5	7.5	37.5	37.5	37.5
Saving in cost	15	15	30	30	30

3. Savings in Labour cost:

Existing labour cost			
Unskilled	(18 × Rs.3,500 × 12 months)		7,56,000
Skilled	(18 × Rs.5,500 × 12 months)		11,88,000
Supervisor	(3 × Rs.6,500 × 12 months)		2,34,000
Maintenance	(2 × Rs.5,000 × 12 months)		1,20,000
			22,98,000
Proposed labor cost			
Skilled	(6 × Rs.7,000 × 12 months)		5,04,000
Maintenance	(1 × Rs.6,500 × 12 months)		78,000
	Cost savings		17,16,000

Savings in subsequent years will increase by 10%

4. Incremental cost of raw material:

Raw material required for old machine:

$(3000000 \times \text{Rs.15 per unit} \times 0.60)$	2,70,00,000
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Raw material required for new machine

$(5000000 \times \text{Rs.15 per unit} \times 0.55)$	4,12,50,000
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Additional raw material Cost	1,42,50,000
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5. Incremental Depreciation:

(Rs. in Lakhs)

Years	1 – 2	3 – 5
Depreciation (with new machine)	54.00	54.00
$(\text{Rs.100 lakh} \times 3 - 10 \times 3) / 5 \text{ years}$		
Depreciation (with old machine)	28.80	-
$(\text{Rs.18 lakh} \times 8/5 \text{ years})$		
Incremental Depreciation	25.20	54.00

6. Insurance:

(Rs. in lakhs)

Years	1	2	3	4	5
New Machine	6.00	5.40	4.86	4.37	3.94
Old Machine	1.88	1.69	1.52	1.37	1.23
Incremental Insurance	4.12	3.71	3.34	3.00	2.71

EXERCISES

Question 1

A company is considering two mutually exclusive projects X and Y. Project X costs Rs. 30,000 and Project Y Rs. 36,000. You have been given below the net present value, probability distribution for each project:

<u>Project X</u>		<u>Project Y</u>	
NPV Estimate	Probability	NPV Estimate	Probability
Rs.		Rs.	
3,000	0.1	3,000	0.2

Strategic Financial Management

6,000	0.4	6,000	0.3
12,000	0.4	12,000	0.3
15,000	0.1	15,000	0.2

- (i) Compute the expected net present value of Projects X and Y.
- (ii) Compute the risk attached to each project i.e., Standard Deviation of each probability distribution.
- (iii) Which project do you consider more risky and why?
- (iv) Compute the profitability index of each project.

Answer

	<i>Project X</i>	<i>Project Y</i>
The expected net present value	Rs. 9,000	Rs. 9,000
Standard Deviation	Rs. 3,795	Rs. 4,450
Coefficient of variation	0.42	0.49
Profitability index	1.30	1.25

Question 2

Determine the risk adjusted net present value of the following projects:

	A	B	C
Net cash outlays (Rs.)	1,00,000	1,20,000	2,10,000
Project life	5 years	5 years	5 years
Annual cash inflow (Rs.)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

The company selects the risk-adjusted rate of discount on the basis of the co-efficient of variation:

Coefficient of variation	Risk adjusted rate of discount	Present value factor 1 to 5 years at risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605

0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

(Answer: NPV of Project A- 8,150, Project B- 24,186 and Project C- 19,180)

Question 3

C developed original specification of a product and founded C Manufacturing Ltd. In 2007 the firm manufactured 980 Nos. at an average price of Rs. 900 each. In 2008 due to continuous price rise of the inputs, he raised his prices at an average of 12%, since he knew he could sell is plant's full capacity of 980 Nos. per year. In spite of price rise for the product, which sold for over Rs. 1,000 for the first time, C was surprised to learn in late 2008 (as may be seen from the financial statements) that C Manufacturing Ltd. show a decline in earnings and still worse, decline in cash flow.

His accountant has brought the following:

- (i) We are following FIFO system for the purpose of issues.
- (ii) Costs are going up faster than 12% and they will go up further in 2009.
- (iii) We are not setting aside enough to replace the machinery; we need to set aside Rs. 1,65,000, not Rs. 1,50,000 so as to be able to buy new machinery.
- (iv) It is still not late to switch to LIFO for 2008. This will reduce closing inventory to Rs. 3,30,000 and raise cost of goods sold.

C Manufacturing Ltd.		Income Statement (Rs. 000)	
	2008		2007
Sales	1,008		900
Cost of goods sold			
Opening inventory	320		250
Raw material	500		400
Labour	200		174
Depreciation	150		150
End inventory	<u>(-)390</u>		<u>(-)320</u>
	780		654

Strategic Financial Management

Gross margin	228	246
Administration expenses	<u>100</u>	<u>92</u>
EBIT	128	154
Interest	<u>50</u>	<u>50</u>
	78	104
Income-tax	<u>39</u>	<u>52</u>
Profit after tax	39	52
Add: Non-cash expenses	150	150
Inventory change	<u>(-)70</u>	<u>(-)70</u>
Cash flow	<u>119</u>	<u>132</u>

Required:

- (i) What is the weighted average inflation factor for the firm using LIFO?
- (ii) If the firm desires a 15 per cent profit margin on sales, how much should the firm charge for the product per unit?

(Answer (i) Weighted average inflation factor for the firm in 2008 = $\frac{955}{746}$

= 1.28 i.e. 28% over 2007

- (ii) Total sales will be Rs. 11,52,000 approximately and alternatively, Total sales will be Rs. 11,23,570)

Question 4

A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of Rs. 50 lakhs per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of Rs. 30 lakhs before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost Rs. 200 lakhs to be financed by a loan repayable in 4 equal instalments commencing from the end of year 1. The interest rate is 16% per annum. At the end of the 4th year, the machine can be sold for Rs. 20 lakhs and the cost of dismantling and removal will be Rs. 15 lakhs.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

	<i>Rs. in lakhs</i>			
<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Sales	322	322	418	418
Material consumption	30	40	85	85
Wages	75	75	85	100
Other expenses	40	45	54	70
Factory overheads	55	60	110	145
Depreciation (as per income-tax rules)	50	38	28	21

Initial stock of materials required before commencement of the processing operations is Rs. 20 lakhs at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be Rs. 55 lakhs and the stocks at the end of year 4 will be nil. The storage of materials will utilize space which would otherwise have been rented out for Rs. 10 lakhs per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of Rs. 15 lakhs in year 1 and Rs. 10 lakhs in year 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of Rs. 30 lakhs per annum payable on this venture. The company's tax rate is 50%.

Present value factors for four years are as under:

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Present value factors	0.870	0.756	0.658	0.572

Advise the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

(Answer: Net present Value = Rs. 123.658 – Rs. 50 = 73.658 lakhs.)

Question 5

ABC Company Ltd. has been producing a chemical product by using machine Z for the last two years. Now the management of the company is thinking to replace this machine either by X or by Y machine. The following details are furnished to you:

	<i>Z</i>	<i>X</i>	<i>Y</i>
Books value (Rs.)	1,00,000	-	-
Resale value now (Rs.)	1,10,000	-	-

Strategic Financial Management

Purchase price (Rs.)	-	1,80,000	2,00,000
Annual fixed costs (including depreciation) (Rs.)	92,000	1,08,000	1,32,000
Variable running costs (including labour) per unit (Rs.)	3	1.50	2.50
Production per hour (unit)	8	8	12

You are also provided with the following details:

Selling price per unit	(Rs.) 20
Cost of materials per unit	(Rs.) 10
Annual operating hours	2,000
Working life of each of the three machines (as from now)	5 years
Salvage value of machines Z Rs. 10,000, X Rs. 15,000, Y Rs. 18,000	

The company charges depreciation using straight line method. It is anticipated that an additional cost of Rs. 8,000 per annum would be incurred on special advertising to sell the extra output of machine. Assume tax rate of 50% and cost of capital 10%. The present value of Re. 1 to be received at the end of the year at 10% is as under:

Year	1	2	3	4	5
Present value	.909	.826	.751	.683	0.621

Required: Using NPV method, you are required to analyse the feasibility of the proposal and make recommendations.

Answer

Computation of Net Present Value

Machine	Z	X	Y
Net Present Value	9,910	7,445	24,934.00
Profitability Index	1.09	1.041	1.12

Question 6

The Globe Manufacturing Company Ltd. is considering an investment in one of the two mutually exclusive proposals – Projects X and Y, which require cash outlays of Rs. 3,40,000 and Rs. 3,30,000 respectively. The certainty-equivalent (C.E.) approach is used in incorporating risk in capital budgeting decisions. The current yield on government bond is

8% and this be used as the riskless rate. The expected net cash flows and their certainty-equivalents are as follows:

Year-end	Cash flow	<u>Project X</u>	Cash flow	<u>Project Y</u>
		C.E.		C.E.
	Rs.		Rs.	
1	1,80,000	.8	1,80,000	.9
2	2,00,000	.7	1,80,000	.8
3	2,00,000	.5	2,00,000	.7

Present value factors of Re. 1 discounted at 8% at the end of year 1, 2 and 3 are .926, .857 and .794 respectively.

Required:

- Which project should be accepted?
- If risk adjusted discount rate method is used, which project would be analysed with a higher rate?

Answer

- Net present value Project X (7,276)

Net present value Project Y 54,580
- Since the certainty-equivalent (C.E.) Co-efficient of project X is lower than project Y, the project X is riskier than project Y. Therefore, if risk adjusted discount rate method is used the project X would be analysed with a higher rate.

Question 7

A firm has an investment proposal, requiring an outlay of Rs. 40,000. The investment proposal is expected to have 2 years' economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be Rs. 25,000 and 0.6 probability that cash inflow after tax will be Rs. 30,000. The probabilities assigned to cash inflows after tax for the year II are as follows:

The Cash inflow year I	Rs. 25,000		Rs. 30,000	
The Cash inflow year II		Probability		Probability
	Rs. 12,000	0.2	Rs. 20,000	0.4
	Rs. 16,000	0.3	Rs. 25,000	0.5
	Rs. 22,000	0.5	Rs. 30,000	0.1

Strategic Financial Management

The firm uses a 10% discount rate for this type of investment.

Required:

- (i) Construct a decision tree for the proposed investment project.
- (ii) What net present value will the project yield if worst outcome is realized? What is the probability of occurrence of this NPV?
- (iii) What will be the best and the probability of that occurrence?
- (iv) Will the project be accepted?

(10% Discount factor	1 year	0.909
	2 year	0.826)

Answer:

- (i) Joint Probability

Path	Joint Probability
1	0.08
2	0.12
3	0.20
4	0.24
5	0.30
6	0.06

- (ii) Worst outcome-NPV- Rs. 7,363 (negative) and probability of this NPV is 8%.
- (iii) Best outcome-NPV- Rs. 12,050 (positive) and probability of this NPV is 6%.
- (iv) Yes, the project will be accepted since the Expected Net present value ´ probability sum total is positive.

Question 8

Neale Tech Plc proposes to launch a new product. The company appointed Kachy Consultants to conduct market study. The consultants suggested that the price of product can be set £36 or £38 or £40 per unit. The company intends to hire a machinery to manufacture the product at £400 000 per annum. However, if annual production exceeds 60 000 units, additional cost of £160 000 per annum will be incurred for hire of machinery. The following data is related to the estimated sale and possible selling prices.

Table I

Selling Price	£36		£38		£40	
	Units	Prob.	Units	Prob.	Units	Prob.
Pessimistic	70 000	0.3	60 000	0.1	30 000	0.4
Most likely	80 000	0.5	70 000	0.7	60 000	0.5
Optimistic	90 000	0.2	90 000	0.2	70 000	0.1

Table – II

Variable Cost	Prob.
£10	0.6
£12	0.4
	1.00

The company has committed publicity expenditure of £80 000per annum. You are required to analyse and advise which selling price shall lead to maximization of profit.

(Answer: There are 16 scenarios possible and the expected value of profit is maximum at the selling price of £38. So the firm should fix up the price at £38.)

Question 9

Small Oil is wondering whether to drill for oil in Chemsfield Basin. The prospectuses are as follows:

Depth of well in feet	Total cost	Probability of		PV of Oil (if found)
	(Million €)	Finding oil	Not Finding oil	(Million €)
2000	4	0.5	0.5	10
4000	5	0.2	0.8	9
6000	6	0.25	0.75	8

Draw a decision tree showing the successive drilling decisions to be made by Small Oil. How deep should it be prepared to drill?

(Answer: Using rolling back technique, we shall take the decision at decision point D₃ first and then it to arrive decision at a decision point D₂ and then use it to arrive decision at a point D₁. At D₃ small oil should drill upto 6000 feet, at D₂ small oil should drill upto 4000 feet and at D₁ Small oil should drill upto 2000 feet.)

LEASING DECISIONS

BASIC CONCEPTS AND FORMULAE

1. Introduction

Lease can be defined as a right to use an equipment or capital goods on payment of periodical amount. Two principal parties to any lease transaction are:

- *Lessor*: The actual owner of equipment permitting use to the other party on payment of periodical amount.
- *Lessee*: One who acquires the right to use the equipment on payment of periodical amount.

2. Types of Leasing

- (a) **Operating Lease**: In this type of lease transaction, the primary lease period is short and the lessor would not be able to realize the full cost of the equipment and other incidental charges thereon during the initial lease period. Besides the cost of machinery, the lessor also bears insurance, maintenance and repair costs etc. Agreements of operating lease generally provide for an option to the lessee/lessor to terminate the lease after due notice.
- (b) **Financial Lease**: It is a long-term arrangement, which is irrevocable during the primary lease period which is generally the full economic life of the leased asset. Under this arrangement lessor is assured to realize the cost of purchasing the leased asset, cost of financing it and other administrative expenses as well as his profit by way of lease rent during the initial (primary) period of leasing itself. Financial lease involves transferring almost all the risks incidental to ownership and benefits arising therefrom except the legal title to the lessee. The variants of financial lease are as follows:
 - **Leveraged lease**: Though a type of financial lease, however, here the lessor may not be a single individual but a group of equity participants and the group borrows a large amount from financial institutions to purchase the leased asset.

Strategic Financial Management

- **Sales and Lease Back Leasing:** Under this arrangement an asset which already exists and is used by the lessee is first sold to the lessor for consideration in cash. The same asset is then acquired for use under financial lease agreement from the lessor. The lessee continues to make economic use of asset against payment of lease rentals while ownership vests with the lessor.
- **Sales-Aid-Lease:** When the leasing company (lessor) enters into an arrangement with the seller, usually manufacturer of equipment, to market the latter's product through its own leasing operations, it is called a 'sales-aid-lease'. The leasing company usually gets a commission on such sales from the manufacturer and doubles its profit.

3. Financial Evaluation of Leasing Arrangement

Lessee Perspective

Calculation of NPV (L) / NAL:

Cost of Asset

Less: PV of Lease rentals (LR)

Add: PV of tax shield on LR

Less: PV of debt tax shield

Less: PV of interest tax shield on displaced debt

Less: PV of salvage value.

If NAL/NPV (L) is +, the leasing alternative to be used, otherwise borrowing alternative would be preferable.

- **Method I (Normal method)**
Discount lease rentals at pre-tax rates and discount rest of cash flows at post tax rates.
- **Method II (Alternatively)**
Discount all cash flows at post tax rates ignoring the cash flow on account of interest tax shield on displaced debt.

4. Evaluation of Lease Methods

- (a) **Present Value Analysis:** In this method, the present value of the annual lease payments (tax adjusted) is compared with that of the annual loan repayments adjusted for tax shield on depreciation and interest, and the alternative which has the lesser cash outflow will be chosen.

- (b) **Internal Rate of Return Analysis:** This method seeks to establish the rate at which the lease rentals, net of tax shield on depreciation are equal to the cost of leasing. In other words, the result of this analysis is the after tax cost of capital explicit in the lease compared with that of the other available sources of finance.
- (c) **Bower-Herringer-Williamson Method:** This method segregates the financial and tax aspects of lease financing. The evaluation procedure under this method is as follows:
 - Compare the present value of debt with the discounted value of lease payments (gross), the rate of discount being the gross cost of debt capital. The net present value is the financial advantage (or disadvantage).
 - Work out the comparative tax benefit during the period and discount it at an appropriate cost of capital. The present value is the operating advantage (or disadvantage) of leasing.
 - If the net result is an advantage, select leasing.

5. Cross-Border Leasing

Cross-border leasing is a leasing arrangement where lessor and lessee are situated in different countries. This raises significant additional issues relating to tax avoidance and tax shelters.

Objectives of Cross-Border Leasing

- Reduce the overall cost of financing through utilization by the lessor of tax depreciation allowances to reduce its taxable income.
- The lessor is often able to utilize non-recourse debt to finance a substantial portion of the equipment cost. The debt is secured by among other things, a mortgage on the equipment and by an assignment of the right to receive payments under the lease.
- Also, depending on the structure, in some countries the lessor can utilize very favourable “leveraged lease” financial accounting treatment for the overall transaction.
- In some countries, it is easier for a lessor to repossess the leased equipment following a lessee default because the lessor is an owner and not a mere secured lender.
- Leasing provides the lessee with 100% financing.

6. Differences between Lease and Hire Purchase

In Hire-purchase transaction the person using the asset on hire-purchase basis is the owner of the asset and full title is transferred to him after he has paid the agreed installments. The asset will be shown in his balance sheet and he can claim depreciation and other allowances on the asset for computation of tax during the currency of hire-purchase agreement and thereafter.

Whereas, on the other hand, in a lease transaction, the ownership of the equipment always vests with the lessor and lessee only gets the right to use the asset. Depreciation and other allowances on the asset will be claimed by the lessor and the asset will also be shown in the balance sheet of the lessor. The lease money paid by the lessee can be charged to his Profit and Loss Account. However, the asset as such will not appear in the balance sheet of the lessee. Such asset for the lessee is, therefore, called off the balance sheet asset.

Question 1

What are the characteristic features of Financial and Operating Lease?

Answer

Salient features of Financial Lease

- (i) It is an intermediate term to long-term arrangement.
- (ii) During the primary lease period, the lease cannot be cancelled.
- (iii) The lease is more or less fully amortized during the primary lease period.
- (iv) The costs of maintenance, taxes, insurance etc., are to be incurred by the lessee unless the contract provides otherwise.
- (v) The lessee is required to take the risk of obsolescence.
- (vi) The lessor is only the Financier and is not interested in the asset.

Salient features of Operating Lease

- (i) The lease term is significantly less than the economic life of the equipment.
- (ii) It can be cancelled by the lessee prior to its expiration date.
- (iii) The lease rental is generally not sufficient to fully amortize the cost of the asset.
- (iv) The cost of maintenance, taxes, insurance are the responsibility of the lessor.
- (v) The lessee is protected against the risk of obsolescence.
- (vi) The lessor has the option to recover the cost of the asset from another party on cancellation of the lease by leasing out the asset.

Question 2

Agrani Ltd. is in the business of manufacturing bearings. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is Rs. 40,00,000 having a useful life of 5 years with the salvage value of Rs. 8,00,000. The full purchase value of machine can be financed by 20% loan repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being Rs. 12,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25%. Company's tax rate is 35 per cent and cost of capital is 16 per cent:

- (i) Advise the company which option it should choose – lease or borrow.
- (ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14% cost of capital (Detailed working notes should be given. Calculations can be rounded off to Rs. lakhs).

Answer

- (i) P.V. of Cash outflow under lease option

(in Rs.)			
Year	Lease Rental after tax	PVIFA @ 13%	Total P.V.
1 – 5	12,00,000 (I – T) = 7,80,000	20% (I – T) 3.517	27,43,260

Cash Outflow under borrowing option

5 equal instalments

Rs. 40,00,000 ÷ 2.991 (PVIFA 20%) = 13,37,345

Tax Advantage

Year	Loan Instalments	On Interest	On Depreciation	Net Cash Outflow	PVIF 13%	Total PV
1	13,37,345	2,80,000	3,50,000	7,07,345	.885	6,26,000
2	13,37,345	2,48,386	2,62,500	8,26,459	.783	6,47,117
3	13,37,345	1,97,249	1,96,875	9,43,221	.693	6,53,652
4	13,37,345	1,43,085	1,47,656	10,46,604	.613	6,41,568
5	13,37,345	78,087	1,10,742	11,48,516	.543	<u>6,23,644</u>
						<u>31,91,981</u>

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Total PV	31,91,981
Less: PV Salvage value adjusted for Tax savings on loss of sale of machinery (Rs. 8,00,000 × .543 = Rs. 4,34,400) + (Rs. 28,359) (See Working Note on Depreciation) 9,49,219 – 8,00,000 = 1,49,219 × .35 × .543 = 28,359	4,62,759
Total present value of cash outflow	<u>27,29,222</u>

Decision: PV of cash outflow of lease option is greater than borrow option and hence borrow option is recommended.

Working Notes:

1. Debt and Interest Payments

Year	Loan Instalments	Loan at the beginning of the year	Interest	Principal	Balance at the end of year
1	13,37,345	40,00,000	8,00,000	5,37,345	34,62,655
2	13,37,345	34,62,655	6,92,531	6,44,814	28,17,841
3	13,37,345	28,17,841	5,63,568	7,73,777	20,44,064
4	13,37,345	20,44,064	4,08,813	9,28,532	11,15,532
5	13,37,345	11,15,532	2,23,106	11,14,239	-

2.

Year	Depreciation
1	40,00,000 × .25 10,00,000
2	30,00,000 × .25 7,50,000
3	22,50,000 × .25 5,62,500
4	16,87,500 × .25 4,21,875
5	12,65,625 × .25 3,16,406

B.V. of machine = 12,65,625 – 3,16,406 = 9,49,219.

(ii) Proposal from the View Point of Lessor

Lessor's Cash Flow

	1	2	3	4	5
Lease Rentals	12,00,000	12,00,000	12,00,000	12,00,000	12,00,000
Less: Dep.	<u>10,00,000</u>	<u>7,50,000</u>	<u>5,62,500</u>	<u>4,21,875</u>	<u>3,16,406</u>
EBT	2,00,000	4,50,000	6,37,500	7,78,125	8,83,594
Less: Tax @ 35%	70,000	1,57,500	2,23,125	2,72,344	3,09,258
EAT	1,30,000	2,92,500	4,14,375	5,05,781	5,74,336
CFAT	11,30,000	10,42,500	9,76,875	9,27,656	8,90,742
PV factor @ 14%	.877	.760	.675	.592	.519
PV	9,91,010	7,92,300	6,59,391	5,49,172	4,62,295
Total P.V. =			34,54,168		
Add: Tax Saving on sale of asset			<u>27,106</u>		
Total PV of cash inflow			34,81,274		
Cost of Machine			<u>40,00,000</u>		
NPV			<u>(5,18,726)</u>		

Decision: Lease rate is not financially viable. Hence, not recommended.

Question 3

Armada Leasing Company is considering a proposal to lease out a school bus. The bus can be purchased for Rs. 5,00,000 and, in turn, be leased out at Rs. 1,25,000 per year for 8 years with payments occurring at the end of each year:

- (i) Estimate the internal rate of return for the company assuming tax is ignored.
- (ii) What should be the yearly lease payment charged by the company in order to earn 20 per cent annual compounded rate of return before expenses and taxes?
- (iii) Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compound rate of return, based on the following assumptions:
 - (i) Tax rate is 40%;
 - (ii) Straight line depreciation;
 - (iii) Annual expenses of Rs. 50,000; and
 - (iv) Resale value Rs. 1,00,000 after the turn.

Strategic Financial Management

Answer

$$(i) \quad \text{Payback period} = \frac{5,00,000}{1,25,000} = 4.00$$

PV factor closest to 4.00 in 8 years is 4.078 at 18%

Thus IRR = 18%

Note: Students may also arrive at the answer of 18.63% instead of 18% if exact calculation are made as follows:-

PV factor in 8 years at 19% is 3.9544

Interpolating for 4.00

$$\text{IRR} = 18\% + \frac{4.0776 - 4.000}{4.0776 - 3.9544} = 18.63\%$$

(ii) Desired lease rent to earn 20% IRR before expenses and taxes:

$$\text{Lease Rent} = \frac{5,00,000}{\text{PVIFA } 8 \text{ yr, } 20\%} = \frac{5,00,000}{3.837} = \text{Rs. } 1,30,310.13 \text{ p.a.}$$

(iii) Revised lease rental on school bus to earn 20% return based on the given conditions.

$$\text{PV factor } [(X - E - D)(1 - T) + D] + (\text{PV factor} \times \text{S.V.}) = \text{Co}$$

$$3.837 [(x - 50,000 - 50,000)(1 - .4) + 50,000] + (.233 \times 1,00,000) = 5,00,000$$

$$3.837 [.6x - 60,000 + 50,000] + 23,300 = 5,00,000$$

$$2.3022x = 5,15,070$$

$$x = 2,23,729.47$$

This may be confirmed as lease rental 2,23,729.47

Less: Expenses + Depreciation 1,00,000.00

EBT 1,23,729.47

Less tax 40% 49,491.79

PAT 74,237.68

Add: Depreciation 50,000.00

CFAT 1,24,237.68

$$\frac{\text{Co} - \text{PV of SV}}{\text{CFAT}} = \frac{5,00,000 - 23,300}{1,24,237.68} = 3.837 \text{ or } 20\%$$

Question 4

Your company is considering acquiring an additional computer to supplement its time-share computer services to its clients. It has two options:

- (i) To purchase the computer for Rs. 22 lakhs.
- (ii) To lease the computer for three years from a leasing company for Rs. 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of Rs. 6 lakhs at the end of the third year. Lease rents are payable at the year-end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review will be worth Rs. 10 lakhs at the end of third year.

Forecast Revenues are:

Year	1	2	3
Amount (Rs. in lakhs)	22.5	25	27.5

Annual operating costs excluding depreciation/lease rent of computer are estimated at Rs. 9 lakhs with an additional Rs. 1 lakh for start up and training costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

Year end	1	2	3
Principal (Rs.'000)	500	850	850
Interest (Rs.'000)	352	272	136

The company uses straight line method (SLM) to depreciate its assets and pays 50% tax on its income. The management approaches you to advice. Which alternative would be recommended and why?

Note: The PV factor at 8% and 16% rates of discount are:

Year	1	2	3
8%	0.926	0.857	0.794
16%	0.862	0.743	0.641

Answer

Working Notes:

- (a) Depreciation: Rs. 22,00,000 – 10,00,000/3 Rs. 4,00,000 p.a.

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- (b) Effective rate of interest after tax shield: $.16 \times (1 - .50) = .08$ or 8%.
- (c) Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

Calculation of NPV

1. Alternative I: Purchase of Computer

<i>Particulars</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Instalment Payment			
Principal	5,00,000	8,50,000	8,50,000
Interest	<u>3,52,000</u>	<u>2,72,000</u>	<u>1,36,000</u>
Total (A)	<u>8,52,000</u>	<u>11,22,000</u>	<u>9,86,000</u>
Tax shield @ 50%;			
Interest payment	1,76,000	1,36,000	68,000
Depreciation	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>
Total (B)	<u>3,76,000</u>	<u>3,36,000</u>	<u>2,68,000</u>
Net Cash outflows (A – B)	4,76,000	7,86,000	7,18,000
PV factor at 8%	0.926	0.857	0.794
PV of Cash outflows	<u>4,40,776</u>	<u>6,73,602</u>	<u>5,70,092</u>
Total PV of Cash outflows:			16,84,470
Less: PV of salvage value (Rs. 10 lakhs $\times$ 0.794)			<u>7,94,000</u>
Net PV of cash outflows			<u>8,90,470</u>

2. Alternative II: Lease of the Computer

<i>Particulars</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Lease rent	5,00,000	5,00,000	5,00,000
10% of gross revenue	2,25,000	2,50,000	2,75,000
Lump sum payment	<u> </u>	<u> </u>	<u>6,00,000</u>
Total Payment	7,25,000	7,50,000	13,75,000
Less: Tax shield @ 50%	<u>3,62,500</u>	<u>3,75,000</u>	<u>6,87,500</u>

Net Cash outflows	<u>3,62,500</u>	<u>3,75,000</u>	<u>6,87,500</u>
PV of Cash outflows @ 8%	<u>3,35,675</u>	<u>3,21,375</u>	<u>5,45,875</u>
Total PV of cash outflows			12,02,925

Recommendation:

Since the Present Value (PV) of net cash outflow of Alternative I is lower, the company should purchase the computer.

Question 5

Fair finance, a leasing company, has been approached by a prospective customer intending to acquire a machine whose Cash Down price is Rs. 3 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3 : 2 : 1.

Depreciation can be assumed to be on straight line basis and Fair Finance's marginal tax rate is 35%. The target rate of return for Fair Finance on the transaction is 10%.

Required:

Calculate the lease rents to be quoted for the lease for three years.

Answer

Capital sum to be placed under Lease

		<i>Rs. in lakhs</i>
Cash Down price of machine		300.00
Less: Present value of depreciation		
Tax Shield		
$100 \times .35 \times \frac{1}{(1.10)}$	31.82	
$100 \times .35 \times \frac{1}{(1.10)^2}$	28.93	
$100 \times .35 \times \frac{1}{(1.10)^3}$	<u>26.30</u>	87.05
		<u>212.95</u>

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If the normal annual lease rent per annum is x , then cash flow will be:

Year	Post-tax cash flow	P.V. of post-tax cash flow
1	$3x \times (1 - .35) = 1.95x$	$1.95 \times (1/1.10) = 1.7727x$
2	$2x \times (1 - .35) = 1.3x$	$1.30 \times [(1/(1.10)^2)] = 1.0743x$
3	$x \times (1 - .35) = 0.65x$	$0.65 \times [1/(1.10)^3] = 0.4884x$
		<u>$= 3.3354x$</u>

Therefore $3.3354x = 212.95$ OR $x = \text{Rs. } 63.8454 \text{ lakhs}$

Year-wise lease rentals:

Rs. in lakhs

Year 1	$3 \times 63.8454 \text{ lakhs} = 191.54$
2	$2 \times 63.8454 \text{ lakhs} = 127.69$
3	$1 \times 63.8454 \text{ lakhs} = 63.85$

Question 6

ABC Ltd. is considering a proposal to acquire a machine costing Rs. 1,10,000 payable Rs. 10,000 down and balance payable in 10 annual equal instalments at the end of each year inclusive of interest chargeable at 15%. Another option before it is to acquire the asset on a lease rental of Rs. 15,000 per annum payable at the end of each year for 10 years. The following information is also available.

- (i) Terminal Scrap value of Rs. 20,000 is realizable, if the asset is purchased.
- (ii) The company provides 10% depreciation on straight line method on the original cost.
- (iii) Income tax rate is 50%.

You are required to compute the analyse cash flows and to advise as to which option is better.

Answer

Option I: To buy the asset:

In this option the firm has to pay Rs. 10,000 down and the balance Rs. 1,00,000 together with interest @ 15% is payable in 10 annual equal instalments. The instalment amount may be calculated by dividing Rs. 1,00,000 by the PVAF for 10 years at 15% i.e.

Annual repayment = $\text{Rs. } 1,00,000 / 5.0188 = \text{Rs. } 19,925$

The cash flows of the borrowing and purchase option may be computed as follows:

<i>Year</i>	<i>Instalment</i>	<i>Interest</i>	<i>Repayment</i>	<i>Balance</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
1	19,925	15,000	4,925	95,075
2	19,925	14,261	5,664	89,411
3	19,925	13,412	6,513	82,898
4	19,925	12,435	7,490	75,408
5	19,925	11,311	8,614	66,794
6	19,925	10,019	9,906	56,888
7	19,925	8,533	11,392	45,496
8	19,925	6,824	13,101	32,395
9	19,925	4,859	15,066	17,329
10	19,925	2,596*	17,329	-

* Difference between the outstanding balance and the last instalment (i.e. Rs. 19,925 – Rs. 17,329 = Rs. 2,596)

<i>Year</i>	<i>Installment</i>	<i>Interest</i>	<i>Depreciation</i>	<i>Tax Shield</i> <i>50% (2 + 3)</i>	<i>Net CF</i> <i>(1-4)</i>	<i>PVF</i>	<i>PV</i>
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>	<i>(7)</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>
0	10,000	-	-	-	-	1.000	10,000
1	19,925	15,000	11,000	13,000	6,925	.870	6,025
2	19,925	14,261	11,000	12,631	7,294	.756	5,514
3	19,925	13,412	11,000	12,206	7,719	.658	5,079
4	19,925	12,435	11,000	11,718	8,207	.572	4,694
5	19,925	11,311	11,000	11,156	8,769	.497	4,358
6	19,925	10,019	11,000	10,510	9,415	.432	4,067
7	19,925	8,533	11,000	9,767	10,158	.376	3,819
8	19,925	6,824	11,000	8,912	11,013	.327	3,601
9	19,925	4,859	11,000	7,930	11,995	.284	3,407
10	19,925	2,596	11,000	6,798	13,127	.247	<u>3,242</u>

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	Present value of total outflows				- 53,806
10	Salvage value (after tax)	10,000	-	-	.247
					<u>+2,470</u>
	Net present value of outflows				<u>- 51,336</u>

It may be noted that (i) depreciation of Rs. 11,000 has been provided for all the 10 years. This is 10% of the original cost of Rs. 1,10,000. (ii) The asset is fully depreciated during its life of 10 years, therefore, the book value at the end of 10th year would be zero. As the asset is having a salvage value of Rs. 20,000, this would be capital gain and presuming it to be taxable at the normal rate of 50%, the net cash inflow on account of salvage value would be Rs. 10,000 only. This is further discounted to find out the present value of this inflow.

Option II – Evaluation of Lease Option:

In case the asset is acquired on lease, there is a lease rent of Rs. 15,000 payable at the end of next 10 years. This lease rental is tax deductible, therefore, the net cash outflow would be only Rs. 7,500 (after tax). The PVAF for 10 years @ 15% is 5.0188. So, the present value of annuity of Rs. 7,500 is

Present value of annuity of outflow = Rs. 7,500 × 5.0188 = Rs. 37,641.

Advice: If the firm opts to buy the asset, the present value of outflow comes to Rs. 51,336; and in case of lease option, the present value of outflows comes to Rs. 37,641. Hence, the firm should opt for the lease option. In this way, the firm will be able to reduce its costs by Rs. 13,695 i.e. Rs. 51,336 – Rs. 37,641. This may also be referred to as Net Benefit of Leasing.

Note: Students may also discount cash flows under both alternatives at after tax cost i.e. 15% (1 – 05) = 7.5%. Discounting will not have any impact on this decision since any discount factor will lead to present value of lease to be less than that of present value of debt).

Question 7

Engineers Ltd. is in the business of manufacturing nut bolts. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is Rs. 20,00,000 having a useful life of 5 years with the salvage value of Rs. 4,00,000 (consider short term capital loss/gain for the Income tax). The full purchase value of machine can be financed by bank loan at the rate of 20% interest repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being Rs. 6,00,000 per annum. The Company follows the written down value method of

depreciation at the rate of 25 per cent. Company's tax rate is 35 per cent and cost of capital is 14 per cent.

- (i) Advise the company which option it should choose – lease or borrow.
- (ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14 per cent cost of capital.

Detailed working notes should be given.

Answer

Discounting Factor:

Cost of finance 20% - Tax 35% = 13%.

- (i) PV of cash outflows under leasing alternative

Year-end	Lease rent after taxes P.A.	PVIFA at 13%	Total P.V.
1 - 5	Rs. 3,90,000	3.517	Rs. 13,71,630

PV of cash outflows under buying alternative

Year end	Loan Instalment	Tax advantage on Interest	Tax advantage on Depreciation	Net Cash Outflow	PVIF at 13%	Total PV
1	6,68,673	1,40,000	1,75,000	3,53,673	0.885	3,13,001
2	6,68,673	1,21,193	1,31,250	4,16,230	0.783	3,25,908
3	6,68,673	98,624	98,438	4,71,611	0.693	3,26,826
4	6,68,673	71,542	73,828	5,23,303	0.613	3,20,785
5	6,68,673	38,819	55,371	5,74,483	0.543	<u>3,11,944</u>
Total PV outflows						15,98,464
Less: PV of Salvage Value (Rs. 4,00,000 * 0.543)						<u>2,17,200</u>
						13,81,264
Less: PV of tax saving on short term capital loss (4,74,609 – 4,00,000) * 35% * .543						14,179
NPV of Cash outflow						13,67,085

Strategic Financial Management

Working Notes:

(1) Schedule of Debt Payment

<i>Year-end</i>	<i>Opening balance</i>	<i>Interest @ 20%</i>	<i>Repayment</i>	<i>Closing Balance</i>	<i>Principal Amount</i>
1	20,00,000	4,00,000	6,68,673	17,31,327	2,68,673
2	17,31,327	3,46,265	6,68,673	14,08,919	3,22,408
3	14,08,919	2,81,784	6,68,673	10,22,030	3,86,889
4	10,22,030	2,04,406	6,68,673	5,57,763	4,64,267
5	5,57,763	1,10,910*	6,68,673	0	5,57,763

*Balancing Figure

(2) Schedule of Depreciation

<i>Year</i>	<i>Opening WDV</i>	<i>Depreciation</i>	<i>Closing WDV</i>
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

- (3) $\text{EMI} = \text{Rs.}20,00,000 / \text{Annuity for 5 years @ } 20\% = \text{i.e. Rs.}20,00,000 / 2.991 = \text{Rs. } 6,68,673.$

Advice: Company is advised to borrow and buy not to go for leasing as NPV of cash outflows is lower in case of buying alternative.

Note: Students may note that the cost of capital of the company given in the question is 14% at which cash flows may also be discounted; the question is however, silent whether this cost of capital is pre-tax or post tax. If it is assumed that this is after tax cost and the cash flows are discounted at this rate there is no change in the advice to the company i.e. borrow and buy. However, if it is assumed that the cost of capital is pre-tax and the same is adjusted with the tax rate to discount the cash flows, the advice to the company changes to leasing.

(ii) Evaluation from Lessor's Point of View

	(1)	(2)	(3)	(4)	(5)
Lease Rent	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000

Less:	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
Depreciation					
EBT	1,00,000	2,25,000	3,18,750	3,89,062	4,41,797
Less: Tax @ 35%	35,000	78,750	1,11,563	1,36,172	1,54,629
EAT	65,000	1,46,250	2,07,187	2,52,890	2,87,168
Add:	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
Depreciation					
Cash Inflows	5,65,000	5,21,250	4,88,437	4,63,828	4,45,371
PV factor @ 14%	0.877	0.769	0.675	0.592	0.519
PV of inflows	4,95,505	4,00,841	3,29,695	2,74,586	2,31,148

Evaluation:

Aggregate PV of cash inflows	17,31,775
Add: PV of salvage value (4,00,000 × 0.519)	2,07,600
Add: Tax shelter on short-term capital loss (4,74,609 – 4,00,000) × 0.35 × 0.519	<u>13,553</u>
PV of all cash inflows	19,52,928
Cost of the machine	20,00,000
NPV	- 47,072

Hence, leasing at this rate is not feasible.

Working Note: Depreciation @ 25% WDV.

Cost = Rs. 20,00,000

(Amount in Rs.)

		Depreciation	Balance
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

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Question 8

ABC Company has decided to acquire a Rs.5,00,000 pulp control device that has a useful life of ten years. A subsidy of Rs.50,000 is available at the time the device is acquired and placed into service. The device would be depreciated on straight-line basis and no salvage value is expected. The company is in the 50% tax bracket. If the acquisition is financed with a lease, lease payments of Rs.55,000 would be required at the beginning of each year. The company can also borrow at 10% repayable in equal instalments. Debt payments would be due at the beginning of each year:

- (i) What is the present value of cash outflow for each of these financing alternatives, using the after-tax cost of debt?
- (ii) Which of the two alternatives is preferable?

Answer

Initial amount borrowed = Rs.5,00,000 – Rs.50,000 = Rs.4,50,000

This amount of Rs.4,50,000 is the amount which together with interest at the rate of 10% on outstanding amount is repayable in equal installments i.e., annuities in the beginning of each of 10 years. The PVAF at the rate of 10% for 9 years is 5.759 and for the year 0 it is 1.000. So, the annuity amount may be ascertained by dividing Rs.4,50,000 by (5.759 + 1.000).

So Annual payment = Rs.4,50,000/6.759 = Rs.66,578

Amount owed at time 0 = Rs.4,50,000 – Rs. 66,578 = Rs.3,83,422.

Schedule of Debt Payment

End of Year	Total Payment Rs.	Interest Rs.	Principal Amount Outstanding Rs.
0	66,578	0	3,83,422
1	66,578	38,342	3,55,186
2	66,578	35,519	3,24,127
3	66,578	32,413	2,89,962
4	66,578	28,996	2,52,380
5	66,578	25,238	2,11,040
6	66,578	21,104	1,65,566
7	66,578	16,557	1,15,545
8	66,578	11,555	55,023
9	66,578	5,502	NIL

Schedule of Cash Outflows: Debt Alternative

(Amount in Rs.)

(1) End of year	(2) Debt Payment	(3) Interest	(4) Dep	(5) Tax Shield [(3)+(4)]0.5	(6) Cash outflows (2) – (5)	(7) PV factors @ 5%	(8) PV
0	66,578	0	0	0	66,578	1.000	66,578
1	66,578	38,342	50,000	44,171	22,407	0.952	21,331
2	66,578	35,519	50,000	42,759	23,819	0.907	21,604
3.	66,578	32,413	50,000	41,206	25,372	0.864	21,921
4	66,578	28,996	50,000	39,498	27,080	0.823	22,287
5	66,578	25,238	50,000	37,619	28,959	0.784	22,704
6	66,578	21,104	50,000	35,552	31,026	0.746	23,145
7	66,578	16,557	50,000	33,279	33,299	0.711	23,676
8	66,578	11,555	50,000	30,777	35,801	0.677	24,237
9	66,578	5,502	50,000	27,751	38,827	0.645	25,043
10	-	0	50,000	25,000	(-25,000)	0.614	(-15,350)

Total present value of Outflows = Rs.2,57,176

Schedule of Cash Outflows: Leasing Alternative

(Amount in Rs.)

End of year	Lease Payment	Tax Shield	Cash Outflow	PVIFA @ 5%	PV
0	55,000	0	55,000	1.000	55,000
1-9	55,000	27,500	27,500	7.109	1,95,498
10	0	27,500	-27,500	0.614	(-16,885)

Total Present value of Outflows = 2,33,613

The present values of cash outflow are Rs.2,57,176 and Rs.2,33,613 respectively under debt and lease alternatives. As under debt alternatives the cash outflow would be more, the lease is preferred.

Note: (i) The repayment of loan as well as payment of lease rental is made in the beginning of the years. So, at the end of year 10, there will not be any

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payment in either option, but the tax benefit of depreciation for the year 10 as well as of lease rentals paid in the beginning of year 10, will be available only at the end of year 10.

- (ii) Students may also calculate depreciation after subtracting the amount of subsidy from original cost, however, even in this situation, lease alternative is preferable.

Question 9

ABC Leasing Ltd. has been approached by a client to write a five years lease on an asset costing Rs.10,00,000 and having estimated salvage value of Rs.1,00,000 thereafter. The company has a after tax required rate of return of 10% and its tax rate is 50%. It provides depreciation @33 $\frac{1}{3}$ % on written down value of the asset. What lease rental will provide the company its after tax required rate of return?

Answer

- (a) In order to find out the annual lease rent, the cash flows from the asset must be evaluated as follows:

Year	Depreciation (Rs.)	Tax Shield (Rs.)	Cash flow (Rs.)	PVF(10%)	PV (Rs.)
1.	3,33,333	1,66,667	1,66,666	.909	1,51,500
2.	2,22,222	1,11,111	1,11,111	.826	91,778
3.	1,48,148	74,074	74,074	.751	55,630
4.	98,766	49,383	49,383	.683	33,728
5.	65,844	32,922	32,922	.621	20,444
6.	Salvage Value		1,00,000	.621	<u>62,100</u>
Present Value of Inflows					<u>4,15,180</u>
Outflow					<u>10,00,000</u>
Net Present value					<u>5,84,820</u>

The firm therefore, should have total recovery of Rs.5,84,820 through the lease rentals. The annual lease rental after tax may be calculated as follows:

$$\begin{aligned}
 \text{Lease rental (after tax)} &= \text{Total recovery required} \div \text{PVAF}_{(10\%n)} \\
 &= \text{Rs.5,84,820} \div 3.791 = \text{Rs.1,54,265} \\
 \text{Now, the lease rental before tax} &= \text{Rs.1,54,265} \div 0.5 \\
 &= \text{Rs.3,08,530}
 \end{aligned}$$

Therefore, the firm should charge a lease rental of Rs.3,08,530 in order to earn a required rate of return of 10% after tax.

Question 10

A Company is planning to acquire a machine costing Rs.5,00,000. Effective life of the machine is 5 years. The Company is considering two options. One is to purchase the machine by lease and the other is to borrow Rs.5,00,000 from its bankers at 10% interest p.a. The Principal amount of loan will be paid in 5 equal instalments to be paid annually. The machine will be sold at Rs.50,000 at the end of 5th year. Following further informations are given:

- (a) Principal, interest, lease rentals are payable on the last day of each year.
- (b) The machine will be fully depreciated over its effective life.
- (c) Tax rate is 30% and after tax. Cost of Capital is 8%.

Compute the lease rentals payable which will make the firm indifferent to the loan option.

Answer

- (a) *Borrowing option:*

Annual Instalment = Rs.50,00,000/- / 5 = Rs.1,00,000/-

Annual depreciation = Rs.50,00,000/- / 5 = Rs.1,00,000/-

Computation of net cash outflow:

Year	Principal	Interest	Total	Tax Saving Depn. & Interest	Net cash Outflow	PV @ 8%	Total PV
1	1,00,000	50,000	1,50,000	45,000	1,05,000	0.926	97,230
2	1,00,000	40,000	1,40,000	42,000	98,000	0.857	93,986
3	1,00,000	30,000	1,30,000	39,000	91,000	0.794	72,254
4	1,00,000	20,000	1,20,000	36,000	84,000	0.735	61,740
5	1,00,000	10,000	1,10,000	33,000	77,000	0.681	52,437
							3,67,647

Less: Present value of Inflows at the end of 5th year

(Rs.50,000/- x 0.7) or Rs.35,000 x 0.681 =

23,835

PV of Net Cash outflows

Rs.3,43,812

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Calculation of lease rentals:

Therefore, Required Annual after tax outflow = $3,43,812/3.993$ = Rs.86,104/-.

Therefore, Annual lease rental = $86,104/0.70$ = Rs.1,23,006/-

Question 11

ABC Ltd. sells computer services to its clients. The company has recently completed a feasibility study and decided to acquire an additional computer, the details of which are as follows:

- (1) *The purchase price of the computer is Rs.2,30,000; maintenance, property taxes and insurance will be Rs.20,000 per year. The additional expenses to operate the computer are estimated at Rs.80,000. If the computer is rented from the owner, the annual rent will be Rs.85,000, plus 5% of annual billings. The rent is due on the last day of each year.*
- (2) *Due to competitive conditions, the company feels that it will be necessary to replace the computer at the end of three years with a more advanced model. Its resale value is estimated at Rs.1,10,000.*
- (3) *The corporate income tax rate is 50% and the straight line method of depreciation is followed.*
- (4) *The estimated annual billing for the services of the new computer will be Rs.2,20,000 during the first year, and Rs.2,60,000 during the subsequent two years.*
- (5) *If the computer is purchased, the company will borrow to finance the purchase from a bank with interest at 16% per annum. The interest will be paid regularly, and the principal will be returned in one lump sum at the end of the year 3.*

Should the company purchase the computer or lease it? Assume (i) cost of capital as 12%, (ii) straight line method of depreciation, (iii) salvage value of Rs.1,10,000 and evaluate the proposal from the point of view of lessor also.

Answer

Alternative 1

1. Evaluation of ABC Ltd's position under buying option considered.

Cost of Capital 12% as per question.

$$\text{Depreciation p.a.} = \frac{2,30,000 - 1,10,000}{3} = 40,000$$

Particulars	Y	E	A	R
Recurrent Cash Flow	1	2	3	NPV
Service Charges Receivable	2,20,000	2,60,000	2,60,000	

Tax, Insurance etc	(-)20,000	(-)20,000	(-)20,000	
Cost of operation	(-)80,000	(-)80,000	(-)80,000	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Interest on Loan @ 16%	(-)36,800	(-)36,800	(-)36,800	
Incremental PBT	43,200	83,200	83,200	
Corporate tax @ 50%	(-)21,600	(-)41,600	(-)41,600	
Incremental PAT	21,600	41,600	41,600	
Depreciation added back	40,000	40,000	40,000	
Incremental recurrent cash flow	61,600	81,600	81,600	
Terminal Cash Flow				
Repayment of Loan			(-)2,30,000	
Disposal of the computer			1,10,000	
Cash flows of buying option	61,600	81,600	38,400	
Discounting factors @ 12%	*0.893	*0.797	*0.712	
NPV of buying option	55,009	65,035	27,341	92,703

2. Evaluation of ABC Ltd's position under leasing option.

Particulars	Y	E	A	R
	1	2	3	NPV
Service Charges Receivable	2,20,000	2,60,000	2,60,000	
Cost of operation	(-)80,000	(-)80,000	(-)80,000	
Lease Rent	(-)96,000	(-)98,000	(-)98,000	
Incremental PBT	44,000	82,000	82,000	
Corporate tax @ 50%	(-)22,000	(-)41,000	(-)41,000	
	22,000	41,000	41,000	
Discounting factor @ 12%	*0.893	*0.797	*0.712	
NPV of Leasing option	19,646	32,677	29,192	81,515
Higher NPV under buying option				11,188

In view of above buying option is recommended

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Note:

1. Maintenance and particularly insurance are to be paid by the owner. So, cash outflow of Rs.10,000 = Rs.20,000* (1 - 0.5) is not considered under leasing option.
2. Cash flows on account of Service Charges Receivable and Cost of Operation of the computer are common to both of the alternatives. These could therefore, have been eliminated. The NPV's of the options will change but the net NPV of Rs.11,188 will be the same. Full credit should be given for such answers also.

Evaluation from the lessor's point of view

The lessor is also supposed to buy the computer under the same terms of financing. His position is analysed below:

	Y	E	A	R
Particulars	1	2	3	NPV
Lease Rental	96,000	98,000	98,000	
Taxes & Insurance – being the owner, will be borne by the lessor	(-)20,000	(-)20,000	(-)20,000	
Loan Interest	(-)36,800	(-)36,800	(-)36,800	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Incremental PBT	(-)800	1,200	1,200	
Corporate tax	400	(-)600	(-)600	
(Assuming that the less will get adjusted with other profits for leasing out other assets)	(-)400	600	600	
Depreciation added back	40,000	40,000	40,000	
	39,600	40,600	40,600	
Terminal Disposal			1,10,000	
Repayment of Loan			(-)2,30,000	
Cash Flow	39,600	40,600	79,400	
Discount factor @ 16 (1- 0.5)% = 8%	*0.926	*0.857	*0.794	
NPV of leasing	36,670	36,670	(-)63,044	8,420

The NPV being positive, the proposal would be acceptable to the lessor also.

Alternative Answer

	Y	E	A	R
Particulars	1	2	3	NPV
Lease Rental	96,000	98,000	98,000	
Taxes & Insurance – being the owner, will be borne by the lessor	(-)20,000	(-)20,000	(-)20,000	
Loan Interest	(-)36,800	(-)36,800	(-)36,800	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Incremental PBT	(-)800	1,200	1,200	
Corporate Tax @50%		(-) 200	(-) 600	
PAT	(-) 800	1,000	600	
Depreciation added back	40,000	40,000	40,000	
			40,600	
			(-) 1,20,000	
	39,200	41,000	(-) 79,400	
	*0.926	*0.857	*0.794	
	36,299	35,137	(-) 63,044	8,392

In view of the positive NPV, the proposal should be accepted by lessor.

Alternative 2

Evaluation from the point of view of Lessee

The lessee has two alternatives: (i) To acquire the computer out of borrowed funds, and (ii) To acquire the computer on lease basis. The financial implications of these two options can be evaluated as follows:

Option I: To acquire computer out of borrowed funds. In this case, the company has to pay interest @ 16% annually and repayment of loan at the end of 3rd year. However, the

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salvage value of Rs.1,10,000 will be available to it. The information can be presented as follows:

Year	Interest	Depreciation	Expenses	Tax Shield (5)=50% of (2+3+4)	Cash outflows	PVF (8%)	PV (Rs.)
(1)	(2)	(3)	(4)	(5)	6=(2+4-5)		
1.	Rs.36,800	Rs.40,000	Rs.20,000	Rs.48,400	Rs.8,400	.926	7,778
2.	36,800	40,000	20,000	48,400	8,400	.857	7,199
3.	36,800	40,000	20,000	48,400	8,400	.794	6,670
4.	Repayment – Savage (2,30,000 – 1,10,000)				Rs.1,20,000	.794	95,280
Present Value of Outflows							1,16,927

Option II: To acquire the Computer on lease basis: In this case, the Company will be required to pay an annual lease rent of Rs.85,000 + 5% of annual billing at the end of year. The financial implications can be evaluated as follows:

Year	Rental	5% of Billing	Tax Shield	Cash Outflow	PV (8%)	{PV}
	(1)	(2)	(3)= (50% of 1+2)	(4)= (1+2+3)		
1	Rs.85,000	Rs.11,000	Rs.48,000	Rs.48,000	.926	Rs.44,448
2	85,000	13,000	49,000	49,000	.857	41,993
3	85,000	13,000	49,000	49,000	.794	38,906
Present Value of Outflows						1,25,347

As the PV of outflows is less in case of buying option, the Company should borrow funds to buyout the computer.

Note: It may be noted that the additional expenses of Rs.80,000 to operate the computer have not been considered in the above calculation. These expenses are required in both the options and are considered to be irrelevant to decide between lease or buy.

Evaluation from the point of view of lessor:

	Year 1	Year 2	Year 3
Lease Rental	85,000	85,000	85,000
5% of Billing	11,000	13,000	13,000

Total Income	96,000	98,000	98,000
Less: Maintenance Expenses	20,000	20,000	20,000
Depreciation	40,000	40,000	40,000
Income before tax	36,000	38,000	38,000
Tax @ 50%	18,000	19,000	19,000
Net Income after Tax	18,000	19,000	19,000
Depreciation added back	40,000	40,000	40,000
Cash Inflow (Annual)	58,000	59,000	59,000
Scrap Value	-	-	1,10,000
	58,000	59,000	1,69,000
PVF (12%)	.893	.797	.712
Present Value	51,794	47,023	1,20,328
Total Present Value			2,19,145
Less: Initial Cost			2,30,000
Net Present Value			<u>-10,855</u>

As the NPV for the lessor is negative, he may not accept the proposal.

Question 12

XYZ Ltd. requires an equipment costing Rs.10,00,000; the same will be utilized over a period of 5 years. It has two financing options in this regard :

- (i) Arrangement of a loan of Rs.10,00,000 at an interest rate of 13 percent per annum; the loan being repayable in 5 equal year end installments; the equipment can be sold at the end of fifth year for Rs.1,00,000.
- (ii) Leasing the equipment for a period of five years at an early rental of Rs.3,30,000 payable at the year end.

The rate of depreciation is 15 percent on Written Down Value (WDV) basis, income tax rate is 35 percent and discount rate is 12 percent.

Advise which of the financing options should XYZ Ltd. exercise and why?

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Answer

Option A

Year	Interest 13%	Depreciation 15% WDV	Interest + Dep.	Tax Shield 03 × 35%	Repayment	Net 01 + 05 – 04 =	PV 12%
	01	02	03	04	05	06	
01	130,000	150,000	280,000	98,000	200,000	232,000	(207,176)
02	104,000	127,500	231,500	81,025	200,000	222,975	(177,711)
03	78,000	108,375	186,375	65,231	200,000	212,769	(151,492)
04	52,000	92,120	144,120	50,442	200,000	201,558	(128,191)
05	26,000	78,300	104,300	36,505	200,000	189,495	(107,443)
06	Scrap Value					100,000	56,700
							(715,313)

Option B

Lease Rent	330,000
Tax Shield	<u>(115,500)</u>
Outflow	<u>214,500</u>
	× 3.599
	Rs. 771,985

Since PV of outflows is lower in the Borrowing option, XYZ Ltd. should avail of the loan and purchase the equipment.

EXERCISES

Question 1

Mr. Lee wants to acquire a mechanized feed spreader that cost €80,000. He intends to operate the equipment for 5 years, at which time it will need to be replaced. However, it is expected to have a salvage value of €10,000 at the end of the fifth year. The asset will be depreciated on a straight-line basis (€16,000 per year) over the 5 years, and Lee is in a 30 percent tax bracket. Two means for financing the feed spreader are available. A lease arrangement calls for lease payments of €19,000 annually, payable in advance. A debt alternative carries an interest of €19,000 annually, payable in advance. A debt alternative

carries an interest cost of 10 percent. Debt payments will be at the start of each of the 5 years using mortgage type of debt amortization.

- (a) Using the present-value method, determine the best alternative.
- (b) Using the internal-rate-of-return method, which is the best alternative? Does your answer differ from that to part a?

(Answer: (a) As the present value of cash outflows under the debt alternative is lower i.e. €55,322 versus €59,986, hence debt option would be preferred. (b) IRR is 10.11%, hence debt option would be preferred.)

Question 2

ABC Ltd., presently leasing computers on a yearly basis rental amounting Rs.10,00,000 per year. These computers can also be purchased by the company for Rs.50,00,000. This purchase can be financed by 16% loan repayable in 4 equal annual instalments.

The economic life of the computer is that of 4 years. It is estimated that the computers would be sold for Rs.20,00,000 at the end of 4 years. The company uses the straight line method of depreciation. Corporate tax rate is 50%.

- (a) Whether computer should be acquired or leased?
- (b) Analyse the financial viability from the point of view of lessor, assuming 14% cost of capital.
- (c) Determine the minimum rent which will yield an IRR of 16% to the lessor.

(Answer: (a) The lease option is financially better. (b) The proposal is not financially viable. (c) Rs.13,92,423)

DIVIDEND DECISIONS

BASIC CONCEPTS AND FORMULAE

1. Introduction

Dividend refers to that portion of profit (after tax) which is distributed among the owners/shareholders of the firm and the profit which is not distributed is known as retained earnings. The dividend policy of the company should aim at achieving the objective of the company to maximise shareholder's wealth.

2. Practical Considerations in Dividend Policy

The practical considerations in dividend policy of a company are as below:

- (a) Financial Needs of the Company;
- (b) Constraints on Paying Dividends- Such as legal, liquidity, access to capital market and investment opportunities;
- (c) Desire of Shareholders; and
- (d) Stability of Dividends.

3. Forms of Dividend

Dividends can be divided into the following forms:

- (i) Cash Dividend; and
- (ii) Stock Dividend.

4. Theories on Dividend Policies

- (a) **Traditional Position:** Expounded by Graham and Dodd, the stock market places considerably more weight on dividends than on retained earnings. Expressed quantitatively in the following valuation model:

$$P = m (D + E/3)$$

If E is replaced by (D+R) then,

$$P = m (4D/3) + m (R/3)$$

- (b) **Walter Approach:** Given by Prof. James E. Walter, the approach focuses on how dividends can be used to maximise the wealth position of equity holders.

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The relationship between dividend and share price on the basis of Walter's formula is shown below:

$$V_c = \frac{D + \frac{R_a}{R_c} (E - D)}{R_c}$$

Where,

V_c = Market value of the ordinary shares of the company

R_a = Return on internal retention, i.e., the rate company earns on retained profits

R_c = Cost of Capital

E = Earnings per share

D = Dividend per share.

- (c) **Gordon Growth Model:** This theory also contends that dividends are relevant. This model explicitly relates the market value of the firm to dividend policy. The relationship between dividend and share price on the basis of Gordon's formula is shown as:

$$V_E = \frac{\hat{e} d_o (1+g)}{\hat{e} k_e - g}$$

Where,

V_E = Market price per share (ex-dividend)

d_o = Current year dividend

g = Constant annual growth rate of dividends

K_e = Cost of equity capital (expected rate of return)

- (d) **Modigliani and Miller (MM) Hypothesis:** This hypothesis states that under conditions of perfect capital markets, rational investors, absence of tax discrimination between dividend income and capital appreciation, given the firm's investment policy, its dividend policy may have no influence on the market price of shares. MM Hypothesis is primarily based on the arbitrage argument. Market price of a share after dividend declared on the basis of MM model is shown below:

$$P_o = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = The prevailing market price of a share

K_e = The cost of equity capital

D_1 = Dividend to be received at the end of period one

P_1 = Market price of a share at the end of period one.

If the firm were to finance all investment proposals, the total amount raised through new shares will be ascertained with the help of the following formula:

$$DN = \frac{I - (E - nD_1)}{P_1}$$

Question 1

Write short note on effect of a Government imposed freeze on dividends on stock prices and the volume of capital investment in the background of Miller-Modigliani (MM) theory on dividend policy.

Answer

Effect of a Government Imposed Freeze on Dividends on Stock Prices and the Volume of Capital Investment in the Background of (Miller-Modigliani) (MM) Theory on Dividend Policy

According to MM theory, under a perfect market situation, the dividend of a firm is irrelevant as it does not affect the value of firm. Thus under MM's theory the government imposed freeze on dividend should make no difference on stock prices. Firms if do not pay dividends will have higher retained earnings and will either reduce the volume of new stock issues, repurchase more stock from market or simply invest extra cash in marketable securities. In all the above cases, the loss by investors of cash dividends will be made up in the form of capital gains. Whether the Government imposed freeze on dividends have effect on volume of capital investment in the background of MM theory on dividend policy have two arguments. One argument is that if the firms keep their investment decision separate from their dividend and financing decision then the freeze on dividend by the Government will have no effect on volume of capital investment. If the freeze restricts dividends the firm can repurchase shares or invest excess cash in marketable securities e.g. in shares of other companies. Other argument is that the firms do not separate their investment decision from dividend and financing decisions. They prefer to make investment from internal funds. In this case, the freeze of dividend by government could lead to increased real investment.

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Question 2

Write short note on factors determining the dividend policy of a company.

Answer

Factors Determining the Dividend Policy of a Company

- (i) **Liquidity:** In order to pay dividends, a company will require access to cash. Even very profitable companies might sometimes have difficulty in paying dividends if resources are tied up in other forms of assets.
- (ii) **Repayment of debt:** Dividend payout may be made difficult if debt is scheduled for repayment.
- (iii) **Stability of Profits:** Other things being equal, a company with stable profits is more likely to pay out a higher percentage of earnings than a company with fluctuating profits.
- (iv) **Control:** The use of retained earnings to finance new projects preserves the company's ownership and control. This can be advantageous in firms where the present disposition of shareholding is of importance.
- (v) **Legal consideration:** The legal provisions lay down boundaries within which a company can declare dividends.
- (vi) **Likely effect of the declaration and quantum of dividend on market prices.**
- (vii) **Tax considerations and**
- (viii) **Others** such as dividend policies adopted by units similarly placed in the industry, management attitude on dilution of existing control over the shares, fear of being branded as incompetent or inefficient, conservative policy Vs non-aggressive one.
- (ix) **Inflation:** Inflation must be taken into account when a firm establishes its dividend policy.

Question 3

What are the determinants of Dividend Policy?

Answer

Determinants of dividend policy

Many factors determine the dividend policy of a company. Some of the factors determining the dividend policy are:

- (i) **Dividend Payout ratio:** A certain share of earnings to be distributed as dividend has to be worked out. This involves the decision to pay out or to retain. The payment of dividends results in the reduction of cash and, therefore, depletion of

assets. In order to maintain the desired level of assets as well as to finance the investment opportunities, the company has to decide upon the payout ratio. D/P ratio should be determined with two bold objectives – maximising the wealth of the firms' owners and providing sufficient funds to finance growth.

- (ii) **Stability of Dividends:** Generally investors favour a stable dividend policy. The policy should be consistent and there should be a certain minimum dividend that should be paid regularly. The liability can take any form, namely, constant dividend per share; stable D/P ratio and constant dividend per share plus something extra. Because this entails – the investor's desire for current income, it contains the information content about the profitability or efficient working of the company; creating interest for institutional investor's etc.
- (iii) **Legal, Contractual and Internal Constraints and Restriction:** Legal and Contractual requirements have to be followed. All requirements of Companies Act, SEBI guidelines, capital impairment guidelines, net profit and insolvency etc., have to be kept in mind while declaring dividend. For example, insolvent firm is prohibited from paying dividends; before paying dividend accumulated losses have to be set off, however, the dividends can be paid out of current or previous years' profit. Also there may be some contractual requirements which are to be honoured. Maintenance of certain debt equity ratio may be such requirements. In addition, there may be certain internal constraints which are unique to the firm concerned. There may be growth prospects, financial requirements, availability of funds, earning stability and control etc.
- (iv) **Owner's Considerations:** This may include the tax status of shareholders, their opportunities for investment dilution of ownership etc.
- (v) **Capital Market Conditions and Inflation:** Capital market conditions and rate of inflation also play a dominant role in determining the dividend policy. The extent to which a firm has access to capital market, also affects the dividend policy. A firm having easy access to capital market will follow a liberal dividend policy as compared to the firm having limited access. Sometime dividends are paid to keep the firms 'eligible' for certain things in the capital market. In inflation, rising prices eat into the value of money of investors which they are receiving as dividends. Good companies will try to compensate for rate of inflation by paying higher dividends. Replacement decision of the companies also affects the dividend policy.

Question 4

How tax considerations are relevant in the context of a dividend decision of a company?

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Answer

Dividend Decision and Tax Considerations

Traditional theories might have said that distribution of dividend being from after-tax profits, tax considerations do not matter in the hands of the payer-company. However, with the arrival of Corporate Dividend Tax on the scene in India, the position has changed. Since there is a clear levy of such tax with related surcharges, companies have a consequential cash outflow due to their dividend decisions which has to be dealt with as and when the decision is taken.

In the hands of the investors too, the position has changed with total exemption from tax being made available to the receiving-investors. In fact, it can be said that such exemption from tax has made the equity investment and the investment in Mutual Fund Schemes very attractive in the market.

Broadly speaking Tax consideration has the following impacts on the dividend decision of a company:

Before Introduction of Dividend Tax: Earlier, the dividend was taxable in the hands of investor. In this case the shareholders of the company are corporates or individuals who are in higher tax slab; it is preferable to distribute lower dividend or no dividend. Because dividend will be taxable in the hands of the shareholder @ 30% plus surcharges while long term capital gain is taxable @ 10%. On the other hand, if most of the shareholders are the people who are in no tax zone, then it is preferable to distribute more dividends.

We can conclude that before distributing dividend, company should look at the shareholding pattern.

After Introduction of Dividend Tax: Dividend tax is payable @ 12.5% - surcharge + education cess, which is effectively near to 14%. Now if the company were to distribute dividend, shareholder will indirectly bear a tax burden of 14% on their income. On the other hand, if the company were to provide return to shareholder in the form of appreciation in market price – by way of Bonus shares – then shareholder will have a reduced tax burden. For securities on which STT is payable, short term capital gain is taxable @ 10% while long term capital gain is totally exempt from tax.

Therefore, we can conclude that if the company pays more and more dividend (while it still have reinvestment opportunities) then to get same after tax return shareholders will expect more before tax return and this will result in lower market price per share.

Question 5

Piyush Loonker and Associates presently pay a dividend of Re. 1.00 per share and has a share price of Rs. 20.00.

- (i) *If this dividend were expected to grow at a rate of 12% per annum forever, what is the firm's expected or required return on equity using a dividend-discount model approach?*
- (ii) *Instead of this situation in part (i), suppose that the dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter. Now what is the firm's expected, or required, return on equity?*

Answer

- (i) **Firm's Expected or Required Return On Equity**

(Using a dividend discount model approach)

According to Dividend discount model approach the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

Where,

K_e = Cost of equity share capital or (Firm's expected or required return on equity share capital)

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Now, $D_1 = D_0 (1 + g)$ or Rs. 1 (1 + 0.12) or Rs. 1.12, $P_0 =$ Rs. 20 and $g = 12\%$ per annum

$$\text{Therefore, } K_e = \frac{\text{Rs.1.12}}{\text{Rs.20}} + 12\%$$

Or, $K_e = 17.6\%$

- (ii) **Firm's Expected or Required Return on Equity**

(If dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter)

Since in this situation if dividends are expected to grow at a super normal growth rate g_s , for n years and thereafter, at a normal, perpetual growth rate of g_n beginning in the year $n + 1$, then the cost of equity can be determined by using the following formula:

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$$P_0 = \sum_{t=1}^{S^n} \frac{\text{Div}_0 (1+g_s)^t}{(1+K_e)^t} + \frac{\text{Div}_{n+1}}{K_e - g_n} \cdot \frac{1}{(1+K_e)^n}$$

Where,

g_s = Rate of growth in earlier years.

g_n = Rate of constant growth in later years.

P_0 = Discounted value of dividend stream.

K_e = Firm's expected, required return on equity (cost of equity capital).

Now,

$g_s = 20\%$ for 5 years, $g_n = 10\%$

Therefore,

$$P_0 = \sum_{t=1}^{S^5} \frac{D_0 (1+0.20)^t}{(1+K_e)^t} + \frac{\text{Div}_{5+1}}{K_e - 0.10} \cdot \frac{1}{(1+K_e)^t}$$

$$P_0 = \frac{1.20}{(1+K_e)^1} + \frac{1.44}{(1+K_e)^2} + \frac{1.73}{(1+K_e)^3} + \frac{2.07}{(1+K_e)^4} + \frac{2.49}{(1+K_e)^5} + \frac{2.49(1+0.10)}{K_e - 0.10} \cdot \frac{1}{(1+K_e)^5}$$

$$\text{or } P_0 = \text{Rs. } 1.20 (\text{PVF}_1, K_e) + \text{Rs. } 1.44 (\text{PVF}_2, K_e) + \text{Rs. } 1.73 (\text{PVF}_3, K_e) + \text{Rs. } 2.07 (\text{PVF}_4, K_e) + \text{Rs. } 2.49 (\text{PVF}_5, K_e) + \frac{\text{Rs. } 2.74 (\text{PVF}_5, K_e)}{K_e - 0.10}$$

By trial and error we are required to find out K_e

Now, assume $K_e = 18\%$ then we will have

$$P_0 = \text{Rs. } 1.20 (0.8475) + \text{Rs. } 1.44 (0.7182) + \text{Rs. } 1.73 (0.6086) + \text{Rs. } 2.07 (0.51589) + \text{Rs. } 2.49 (0.43710) + \text{Rs. } 2.74 (0.4371) \cdot \frac{1}{0.18 - 0.10}$$

$$= \text{Rs. } 1.017 + \text{Rs. } 1.034 + \text{Rs. } 1.052 + \text{Rs. } 1.067 + \text{Rs. } 1.09 + \text{Rs. } 14.97$$

$$= \text{Rs. } 20.23$$

Since the present value of dividend stream is more than required it indicates that K_e is greater than 18%.

Now, assume $K_e = 19\%$ we will have

$$\begin{aligned}
 P_0 &= \text{Rs. } 1.20 (0.8403) + \text{Rs. } 1.44 (0.7061) + \text{Rs. } 1.73 (0.5934) + \text{Rs. } 2.07 (0.4986) \\
 &\quad + \text{Rs. } 2.49 (0.4190) + \text{Rs. } 2.74 (0.4190) \times \frac{1}{0.19 - 0.10} \\
 &= \text{Rs. } 1.008 + \text{Rs. } 1.016 + \text{Rs. } 1.026 + \text{Rs. } 1.032 + \text{Rs. } 1.043 + \text{Rs. } 12.76 \\
 &= \text{Rs. } 17.89
 \end{aligned}$$

Since the market price of share (expected value of dividend stream) is Rs. 20. Therefore, the discount rate is closer to 18% than it is to 19%, we can get the exact rate by interpolation by using the following formula:

$$K_e = \frac{r - (PV_s - PV_D)}{DPV} \times Dr$$

Where,

r = Either of two interest rates

PV_s = Present value of share

PV_D = Present value of dividend stream

Dr = Difference in value of dividend stream

DPV = Difference in calculated present value of dividend stream.

$$\begin{aligned}
 K_e &= \frac{18\% - (\text{Rs. } 20 - \text{Rs. } 20.23)}{\text{Rs. } 20.23 - \text{Rs. } 17.89} \times 0.01 \\
 &= \frac{18\% - (-\text{Rs. } 0.23)}{\text{Rs. } 2.34} \times 0.01 \\
 &= \frac{18\% + (\text{Rs. } 0.23)}{\text{Rs. } 2.34} \times 0.01 \\
 &= 18\% + 0.10\% \\
 &= 18.10\%
 \end{aligned}$$

Therefore, the firm's expected, or required, return on equity is 18.10%. At this rate the present discounted value of dividend stream is equal to the market price of the share.

Question 6

Sahu & Co. earns Rs. 6 per share having capitalisation rate of 10 per cent and has a return on investment at the rate of 20 per cent. According to Walter's model, what should be the price per share at 30 per cent dividend payout ratio? Is this the optimum payout ratio as per Walter?

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Answer

$$\text{Walter Model is } V_c = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where:

 V_c = Market value of the share R_a = Return on Retained earnings R_c = Capitalisation Rate E = Earning per share D = Dividend per share

Hence, if Walter model is applied

$$\text{Market value of the share } P = \frac{1.80 + \frac{.20}{.10}(6 - 1.80)}{.10}$$

$$P = \frac{1.80 + 8.40}{.10}$$

$$p = \frac{1.80 + \frac{.20}{.10}(4.20)}{.10}$$

$$P = \text{Rs. } 102$$

This is not the optimum payout ratio because $R_a > R_c$ and therefore V_c can further go up if payout ratio is reduced.

Question 7

X Ltd., has 8 lakhs equity shares outstanding at the beginning of the year 2003. The current market price per share is Rs. 120. The Board of Directors of the company is contemplating Rs. 6.4 per share as dividend. The rate of capitalisation, appropriate to the risk-class to which the company belongs, is 9.6%:

- (i) *Based on M-M Approach, calculate the market price of the share of the company, when the dividend is – (a) declared; and (b) not declared.*
 - (ii) *How many new shares are to be issued by the company, if the company desires to fund an investment budget of Rs. 3.20 crores by the end of the year assuming net income for the year will be Rs. 1.60 crores?*
-

Answer

Modigliani and Miller (M-M) – Dividend Irrelevancy Model:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = Existing market price per share i.e. Rs. 120

P_1 = Market price of share at the year-end (to be determined)

D_1 = Contemplated dividend per share i.e. Rs. 6.4

K_e = Capitalisation rate i.e. 9.6%.

(i) (a) Calculation of share price when dividend is declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 6.4$$

$$P_1 = 120 \times 1.096 - 6.4$$

$$= 125.12$$

(b) Calculation of share price when dividend is not declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 0$$

$$P_1 = 131.52$$

(ii) Calculation of No. of shares to be issued:

(Rs. in lakhs)

Particulars

If dividend
declared

If dividend not
declared

Net Income

160

160

Less: Dividend paid

51.20

—

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Retained earnings	108.80	160
Investment budget	<u>320</u>	<u>320</u>
Amount to be raised by issue of new shares (i)	<u>211.20</u>	<u>160</u>
Market price per share (ii)	125.12	131.52
No. of new shares to be issued (ii)	1,68,797.95	1,21,654.50
Or say	1,68,798	1,21,655

Question 8

Capital structure of Sun Ltd., as at 31.3.2003 was as under:

	<i>(Rs. in lakhs)</i>
<i>Equity share capital</i>	80
<i>8% Preference share capital</i>	40
<i>12% Debentures</i>	64
<i>Reserves</i>	32

Sun Ltd., earns a profit of Rs. 32 lakhs annually on an average before deduction of income-tax, which works out to 35%, and interest on debentures.

Normal return on equity shares of companies similarly placed is 9.6% provided:

- (a) Profit after tax covers fixed interest and fixed dividends at least 3 times.*
- (b) Capital gearing ratio is 0.75.*
- (c) Yield on share is calculated at 50% of profits distributed and at 5% on undistributed profits.*

Sun Ltd., has been regularly paying equity dividend of 8%.

Compute the value per equity share of the company.

Answer

Calculation of Profit after tax (PAT)

	Rs.
Profit before interest and tax (PBIT)	32,00,000
Less: Debenture interest (Rs. 64,00,000 × 12/100)	<u>7.68,000</u>
Profit before tax (PBT)	24,32,000
Less: Tax @ 35%	<u>8.51,200</u>

Profit after tax (PAT)		15,80,800
Less: Preference Dividend		
(Rs. 40,00,000 × 8/100)	3,20,000	
Equity Dividend (Rs. 80,00,000 × 8/100)	<u>6,40,000</u>	<u>9,60,000</u>
Retained earnings (Undistributed profit)		6,20,800

Calculation of Interest and Fixed Dividend Coverage

$$= \frac{\text{PAT} + \text{Debenture interest}}{\text{Debenture interest} + \text{Preference dividend}}$$

$$= \frac{15,80,800 + 7,68,000}{7,68,000 + 3,20,000} = \frac{23,48,800}{10,88,000} = 2.16 \text{ times}$$

Calculation of Capital Gearing Ratio

$$\text{Capital Gearing Ratio} = \frac{\text{Fixed interest bearing funds}}{\text{Equity shareholders' funds}}$$

$$= \frac{\text{Preference Share Capital} + \text{Debentures}}{\text{Equity Share Capital} + \text{Reserves}}$$

$$= \frac{40,00,000 + 64,00,000}{80,00,000 + 32,00,000} = \frac{1,04,00,000}{1,12,00,000}$$

$$= 0.93$$

Calculation of Yield on Equity Shares:

Yield on equity shares is calculated at 50% of profits distributed and 5% on undistributed profits:

	(Rs.)
50% on distributed profits (Rs. 6,40,000 × 50/100)	3,20,000
5% on undistributed profits (Rs. 6,20,800 × 5/100)	<u>31,040</u>
Yield on equity shares	<u>3,51,040</u>

$$\text{Yield on equity shares \%} = \frac{\text{Yield on shares}}{\text{Equity share capital}} \times 100$$

$$= \frac{3,51,040}{80,00,000} \times 100 = 4.39\% \text{ or, } 4.388\%.$$

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Calculation of Expected Yield on Equity shares

Note: There is a scope for assumptions regarding the rates (in terms of percentage for every one time of difference between Sun Ltd. and Industry Average) of risk premium involved with respect to Interest and Fixed Dividend Coverage and Capital Gearing Ratio. The below solution has been worked out by assuming the risk premium as:

- (i) 1% for every one time of difference for Interest and Fixed Dividend Coverage.
- (ii) 2% for every one time of difference for Capital Gearing Ratio.
- (i) Interest and fixed dividend coverage of Sun Ltd. is 2.16 times but the industry average is 3 times. Therefore, risk premium is added to Sun Ltd. Shares @ 1% for every 1 time of difference.
- $$\begin{aligned}\text{Risk Premium} &= 3.00 - 2.16 \text{ (1\%)} \\ &= 0.84 \text{ (1\%)} = 0.84\%\end{aligned}$$
- (ii) Capital Gearing ratio of Sun Ltd. is 0.93 but the industry average is 0.75 times. Therefore, risk premium is added to Sun Ltd. shares @ 2% for every 1 time of difference.
- $$\begin{aligned}\text{Risk Premium} &= 0.75 - 0.93 \text{ (2\%)} \\ &= 0.18 \text{ (2\%)} \\ &= 0.36\%\end{aligned}$$

	(%)
Normal return expected	9.60
Add: Risk premium for low interest and fixed dividend coverage	0.84
Add: Risk premium for high interest gearing ratio	<u>0.36</u>
	<u>10.80</u>

Value of Equity Share

$$\begin{aligned}&= \frac{\text{Actual yield}}{\text{Expected yield}} \times \text{Paid-up value of share} \\ &= \frac{4.39}{10.80} \times 100 = \text{Rs. } 40.65\end{aligned}$$

Question 9

Mr. A is contemplating purchase of 1,000 equity shares of a Company. His expectation of return is 10% before tax by way of dividend with an annual growth of 5%. The Company's

last dividend was Rs. 2 per share. Even as he is contemplating, Mr. A suddenly finds, due to a budget announcement dividends have been exempted from tax in the hands of the recipients. But the imposition of dividend Distribution tax on the Company is likely to lead to a fall in dividend of 20 paise per share. A's marginal tax rate is 30%.

Required:

Calculate what should be Mr. A's estimates of the price per share before and after the Budget announcement?

Answer

The formula for determining value of a share based on expected dividend is:

$$P_0 = \frac{D_0 (1+g)}{(k-g)}$$

Where

P_0 = Price (or value) per share

D_0 = Dividend per share

g = Growth rate expected in dividend

k = Expected rate of return

Hence,

Price estimate before budget announcement:

$$P_0 = \frac{2 \times (1+0.05)}{(0.10-0.05)} = \text{Rs. } 42.00$$

Price estimate after budget announcement:

$$P_0 = \frac{1.80 \times (1.05)}{(0.07-0.05)} = \text{Rs. } 94.50$$

Question 10

A Company pays a dividend of Rs. 2.00 per share with a growth rate of 7%. The risk free rate is 9% and the market rate of return is 13%. The Company has a beta factor of 1.50. However, due to a decision of the Finance Manager, beta is likely to increase to 1.75. Find out the present as well as the likely value of the share after the decision.

Answer

In order to find out the value of a share with constant growth model, the value of K_e should be ascertained with the help of 'CAPM' model as follows:

$$K_e = R_f + b (K_m - R_f)$$

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Where,

K_e = Cost of equity

R_f = Risk free rate of return

b = Portfolio Beta i.e. market sensitivity index

K_m = Expected return on market portfolio

By substituting the figures, we get

$$\begin{aligned} K_e &= 0.09 + 1.5 (0.13 - 0.09) \\ &= 0.15 \text{ or } 15\% \end{aligned}$$

and the value of the share as per constant growth model is

$$P_0 = \frac{D_1}{(k_e - g)}$$

Where,

P_0 = Price of a share

D_1 = Dividend at the end of the year 1

K_e = Cost of equity

G = growth

$$P_0 = \frac{2.00}{(k_e - g)}$$

$$\begin{aligned} P_0 &= \frac{2.00}{0.15 - 0.07} \\ &= \text{Rs. } 25.0 \end{aligned}$$

However, if the decision of finance manager is implemented, the beta (b) factor is likely to increase to 1.75 therefore, K_e would be

$$\begin{aligned} K_e &= R_f + b (K_m - R_f) \\ &= 0.09 + 1.75 (0.13 - 0.09) \\ &= 0.16 \text{ or } 16\% \end{aligned}$$

The value of share is

$$P_0 = \frac{D_1}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.16 - 0.07}$$

$$= \text{Rs. } 22.22$$

Question 11

The following figures are collected from the annual report of XYZ Ltd.:

	Rs.
Net Profit	30 lakhs
Outstanding 12% preference shares	100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%

What should be the approximate dividend pay-out ratio so as to keep the share price at Rs. 42 by using Walter model?

Answer

Rs. in lakhs

Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Therefore earning per share	18/3 = Rs. 6.00

Cost of capital i.e. (K_e)

(Assumed) 16%

Let, the dividend payout ratio be X and so the share price will be:

$$P = \frac{D}{K_e} + \frac{\frac{r(E-D)}{K_e}}{K_e}$$

Here $D = 6x$; $E = \text{Rs. } 6$; $r = 0.20$ and $K_e = 0.16$ and $P = \text{Rs. } 42$

$$\text{Hence Rs. } 42 = \frac{6x}{0.16} + \frac{0.2(6-6x)}{0.16 \times 0.16}$$

$$\text{Or, Rs. } 42 = 37.50X + 46.875(1-x)$$

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$$= 9.375x = 4.875$$

$$x = 0.52$$

So, the required dividend payout ratio will be = 52%

Question 12

The following information pertains to M/s XY Ltd.

Earnings of the Company	Rs.5,00,000
Dividend Payout ratio	60%
No. of shares outstanding	1,00,000
Equity capitalization rate	12%
Rate of return on investment	15%

- (i) What would be the market value per share as per Walter's model?
- (ii) What is the optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio?

Answer

(a) M/s X Y Ltd.

- (i) Walter's model is given by

$$P = \frac{D + (E - D)(r / k_e)}{K_e}$$

Where,

P	=	Market price per share.
E	=	Earnings per share = Rs.5
D	=	Dividend per share = Rs.3
r	=	Return earned on investment = 15%
K _e	=	Cost of equity capital = 12%

$$P = \frac{3 + (5 - 3) \times \frac{0.15}{0.12}}{0.12} = \frac{3 + 2.0 \times \frac{.15}{.12}}{0.12}$$

$$= \text{Rs.}52.08$$

- (ii) According to Walter's model when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out

ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$\frac{0 + (5 - 0) \frac{0.15}{0.12}}{0.12} = \text{Rs.} 52.08$$

Question 13

ABC Ltd. has 50,000 outstanding shares. The current market price per share is Rs.100 each. It hopes to make a net income of Rs.5,00,000 at the end of current year. The Company's Board is considering a dividend of Rs.5 per share at the end of current financial year. The company needs to raise Rs.10,00,000 for an approved investment expenditure. The company belongs to a risk class for which the capitalization rate is 10%. Show, how the M-M approach affects the value of firm if the dividends are paid or not paid.

Answer

When dividends are paid

$$100 = (5 + P_1) / (1 + 0.10)$$

Therefore, $P_1 = \text{Rs.} 105/-$.

Value of firm

$$= \text{Rs.} ([50,000/- + 7,50,000/- / 105/-] \times 105/-) - 10,00,000/- + 5,00,000/- / 1.10$$

$$= \text{Rs.} (60,00,000/- - 5,00,000/-) / 1.10$$

$$= \text{Rs.} 50,00,000/-$$

When dividend is not paid

$$100 = 1 / 1.1 \times P_1$$

Therefore, $P_1 = \text{Rs.} 110/-$.

Value of firm

$$= \text{Rs.} ([50,000/- + (5,00,000/- / 110/-) \times 110/-] - 10,00,000/- + 5,00,000/-) / 1.10$$

$$= \text{Rs.} (60,00,000/- - 5,00,000/-) / 1.10$$

$$= \text{Rs.} 50,00,000/-$$

M.M. Approach indicates that the value of the firm in both the situations will be the same.

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Question 14

The following information is supplied to you:

	Rs.
Total Earnings	2,00,000
No. of equity shares (of Rs.100 each)	20,000
Dividend paid	1,50,000
Price/Earning ratio	12.5

- Ascertain whether the company is following an optimal dividend policy.
- Find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share.
- Will your decision change, if the P/E ratio is 8 instead of 12.5?

Answer

- The EPS of the firm is Rs.10 (i.e., Rs.2,00,000/20,000). The P/E Ratio is given at 12.5 and the cost of capital, k_e , may be taken at the inverse of P/E ratio. Therefore, k_e is 8 (i.e., $1/12.5$). The firm is distributing total dividends of Rs.1,50,000 among 20,000 shares, giving a dividend per share of Rs.7.50. the value of the share as per Walter's model may be found as follows:

$$\begin{aligned}
 P &= \frac{D}{K_e} + \frac{(r/K_e)(E - D)}{K_e} \\
 &= \frac{7.50}{.08} + \frac{(.10/.08)(10 - 7.5)}{.08} \\
 &= \text{Rs.132.81}
 \end{aligned}$$

The firm has a dividend payout of 75% (i.e., Rs.1,50,000) out of total earnings of Rs.2,00,000. since, the rate of return of the firm, r , is 10% and it is more than the k_e of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be

$$\begin{aligned}
 P &= \frac{D}{k_e} + \frac{(r/K_e)(E - D)}{K_e} \\
 &= \frac{0}{.08} + \frac{(.10/.80)(10 - 0)}{.08} \\
 &= \text{Rs.156.25}
 \end{aligned}$$

So, theoretically the market price of the share can be increased by adopting a zero payout.

- (ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the k_e would be equal to the rate of return, r , of the firm. The k_e would be 10% ($=r$) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.
- (iii) If the P/E is 8 instead of 12.5, then the k_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e > r$ and the market price, as per Walter's model would be

$$P = \frac{D}{K_e} + \frac{(r/K_e)(E - D)}{K_e}$$

$$= \frac{7.50}{.125} + \frac{(.1/.125)(10 - 7.5)}{.125}$$

$$= \text{Rs.76}$$

Question 15

M Ltd. belongs to a risk class for which the capitalization rate is 10%. It has 25,000 outstanding shares and the current market price is Rs. 100. It expects a net profit of Rs. 2,50,000 for the year and the Board is considering dividend of Rs. 5 per share.

M Ltd. requires to raise Rs. 5,00,000 for an approved investment expenditure. Show, how the MM approach affects the value of M Ltd. if dividends are paid or not paid.

Answer

A When dividend is paid

- (a) Price per share at the end of year 1

$$100 = \frac{1}{1.10}(\text{Rs.5} + P_1)$$

$$110 = \text{Rs.5} + P_1$$

$$P_1 = 105$$

- (b) Amount required to be raised from issue of new shares

$$\text{Rs.5,00,000} - (2,50,000 - 1,25,000)$$

$$\text{Rs.5,00,000} - 1,25,000 = \text{Rs.3,75,000}$$

- (c) Number of additional shares to be issued

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$$\frac{3,75,000}{105} = \frac{75,000}{21} \text{ shares or say 3572 shares}$$

- (d) Value of M Ltd.
(Number of shares × Expected Price per share)
i.e., $(25,000 + 3,572) \times \text{Rs.}105 = \text{Rs.}30,00,060$

B When dividend is not paid

- (a) Price per share at the end of year 1

$$100 = \frac{P_1}{1.10}$$

$$P_1 = 110$$

- (b) Amount required to be raised from issue of new shares
 $\text{Rs.}5,00,000 - 2,50,000 = 2,50,000$

- (c) Number of additional shares to be issued
 $\frac{2,50,000}{110} = \frac{25,000}{11} \text{ shares or say 2273 shares.}$

- (d) Value of M Ltd.,
 $(25,000 + 2273) \times \text{Rs.}110$
 $= \text{Rs.}30,00,030$

Whether dividend is paid or not, the value remains the same.

Question 16

T Ltd. has promoted an open-ended equity oriented scheme in 1999 with two plans – Dividend Reinvestment Plan (Plan-A) and a Bonus Plan (Plan-B); the face value of the units was Rs.10 each. X and Y invested Rs.5,00,000 each on 1.4.2001 respectively in Plan-A and Plan-B, when the NAV was Rs.42.18 for Plan A and Rs.35.02 for Plan-B, X and Y both redeemed their units on 31.3.2008. Particulars of dividend and bonus declared on the units over the period were as follows:

Date	Dividend	Bonus	NAV	
		Ratio	Plan A	Plan B
15.9.2001	15	-	46.45	29.10
28.7.2002	-	1 : 6	42.18	30.05
31.3.2003	20	-	48.10	34.95
31.10.2003	-	1 : 8	49.60	36.00

15.3.2004	18	-	52.05	37.00
24.3.2005	-	1 : 11	53.05	38.10
27.3.2006	16	-	54.10	38.40
28.2.2007	12	1 : 12	55.20	39.10
31.3.2008	-	-	50.10	34.10

You are required to calculate the annual return for X and Y after taking into consideration the following information :

- (i) Securities transaction tax @ 2% on redemption.
- (ii) Liability of capital gains to income tax
 - (a) Long-term capital gain-exempt; and
 - (b) Short-term capital gains at 10% plus education cess at 3%.

Answer

X: Plan A

$$\text{Unit acquired} = \frac{500,000}{42.18} = 11,854$$

Date	Units held	Dividend %	Dividend Amount	Reinvestment Rate	New Units	Total Units
01.04.00						11,854
15.09.01	11,854	15	17,781	46.45	383	12,237
31.03.03	12,237	20	24,474	48.10	509	12,746
15.03.04	12,746	18	22,943	52.05	441	13,187
27.03.06	13,187	16	21,099	54.10	390	13,577
28.02.07	13,577	12	16,292	55.20	295	13,872
31.03.08	Redemption 13,872 × 50.10				Rs.	694,987
	Less: STT 0.2 %					<u>1,390</u>
						693,597
	Less: Short-term capital gains					<u>-</u>
	Net proceeds					693,597

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	Less: Cost of acquisition			<u>500,000</u>
	Total Gain	Rs.		<u>193,597</u>
CVAF				
	r, 8			6.936
Annual Return				27.67%
$\frac{\text{Y : Plan B}}{\text{Units acquired}} = \frac{500,000}{35.02} = 14,278$				
Date	Units held	Ratio	Bonus Number	Total Units
01.04.00				14,278
28.07.02	14,278	1 : 6	2,380	16,658
31.10.03	16,658	1 : 8	2,082	18,740
24.03.05	18,740	1 : 11	1,704	20,444
28.02.07	20,444	1 : 12	1,704	22,148
31.03.08	Redemption 22,148 × 34.10			Rs. 755,247
	Less: STT 0.2 %			<u>1,510</u>
				753,737
	Less: Short-term capital gains			<u>-</u>
	Net proceeds			753,737
	Less: Cost of acquisition			<u>500,000</u>
	Total Gain		Rs.	<u>253,737</u>
CVAF r, 8				7.5374
Annual Return				29.29 %

EXERCISES

Question 1

CMC plc has an all-common-equity capital structure and has 200,000 shares of £2 par value equity shares outstanding. When CMC's founder, who was also its research director and most successful inventor, retired unexpectedly to the South Pacific in late 2009, CMC was left suddenly and permanently with materially lower growth expectations and

relatively few attractive new investment opportunities. Unfortunately, there was no way to replace the founder's contributions to the firm. Previously, CMC found it necessary to plough back most of its earnings to finance growth, which averaged 12% per year. Future growth at a 5% rate is considered realistic; but that level would call for an increase in the dividend payout. Further, it now appears that new investment projects with at least the 14 % rate of return required by CMC's shareholders ($k_e = 14\%$) would amount to only £800,000 for 2010 in comparison to a projected £2,000,000 of net income. If the existing 20% dividend payout were continued, retained earnings would be £16,00,000 in 2010, but, as noted, investments that yield the 14 % cost of capital would amount to only £800,000.

The one encouraging thing is that the high earnings from existing assets are expected to continue, and net income of £20,00,000 is still expected for 2010. Given the dramatically changed circumstances, CMC's board is reviewing the firm's dividend policy.

- (a) Assuming that the acceptable 2010 investment projects would be financed entirely by earnings retained during the year, calculate DPS in 2010, assuming that CMC uses the residual payment policy.
- (b) What payout ratio does your answer to part (a) imply for 2010?
- (c) If a 60% payout ratio is adopted and maintained for the foreseeable future, what is your estimate of the present market price of the equity share? How does this compare with the market price that should have prevailed under the assumptions existing just before the news about the founder's retirement? If the two values of P_0 are different. Comment on why?
- (d) What would happen to the price of the share if the old 20% payout were continued? Assume that if this payout is maintained, the average rate of return on the retained earnings will fall to 7.5% and the new growth rate will be

$$G = (1.0 - \text{Payout ratio}) \times (\text{ROE})$$

$$= (1.0 - 0.2) (7.5\%) = (0.8) (7.5\%) = 6.0\%$$

(Answer: (a) $\text{DPS} = \text{£}6 = D_1$ (b) 60% (c) £ 66.67 (d) If the payout ratio were continued at 20%, even after internal investment opportunities had declined, the price of the stock would drop to £25 rather than to £66.67.)

Question 2

Zumo & Co. is a watch manufacturing company and is all equity financed and has paid up capital Rs.10,00,000 (Rs.10 per shares)

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The other data related to the company is as follows:

<i>Year</i>	<i>EPS (Rs.)</i>	<i>Net Dividend per share (Rs.)</i>	<i>Share Price (Rs.)</i>
2004	4.20	1.70	25.20
2005	4.60	1.80	18.40
2006	5.10	2.00	25.50
2007	5.50	2.20	27.50
2008	6.20	2.50	37.20

Zumo & Co. has hired one management consultant, Vidal Consultants to analyze the future earnings and other related item for the forthcoming years.

As per Vidal Consultant's report

- (1) The earnings and dividend will grow at 25% for the next two years.
- (2) Earnings are likely at rate of 10% from 3rd year and onwards.
- (3) Further if there is reduction in earnings growth occurs dividend payout ratio will increase to 50%

Assuming the tax rate as 33% (not expected to change in the foreseeable future) calculate the estimated share price and P/E Ratio which analysts now expect for Zumo & Co., using the dividend valuation model.

You may further assume that post tax cost of capital is 18%.

(Answer: Expected Market Price of Share Rs. 53.34 and PE Ratio= 8.6)

Question 3

Truly Plc presently pay a dividend of £ 1.00 per share and has a share price of £ . 20.00.

- (i) If this dividend were expected to grow at a rate of 12% per annum forever, what is the firm's expected or required return on equity using a dividend-discount model approach?
- (ii) Instead of this situation in part (i), suppose that the dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter. Now what is the firm's expected, or required, return on equity?

(Answer: (i) $K_e = 17.6\%$ (ii) $K_e = 18.10\%$)

INDIAN CAPITAL MARKET

BASIC CONCEPTS

1. Introduction

Indian financial market consists of capital market, money market and the debt market.

2. Capital Markets/Securities Market

The capital markets are relatively for long-term (greater than one year maturity) financial instruments (e.g. bonds and stocks).

- **Primary Market:** A market where new securities are bought and sold for the first time is called the New Issues market or the IPO market.
- **Secondary Market:** A market in which an investor purchases a security from another investor rather than the issuer, subsequent to the original issuance in the primary market.

There are many similarities and differences between Primary Market and Capital Market

3. Stock Exchange and Its Operations

Stock exchange is a place where the securities issued by the Government, public bodies and Joint Stock Companies are traded.

4. Leading Stock Exchanges in India

- (a) **Bombay Stock Exchange Limited (BSE):** It is the oldest stock exchange in Asia. Its index is *SENSEX*. The Exchange has a nation-wide reach with a presence in 417 cities and towns of India. The BSE's On-Line Trading System (BOLT) is a proprietary system of the Exchange and is BS 7799-2-2002 certified. The surveillance and clearing and settlement functions of the Exchange are ISO 9001:2000 certified.
- (b) **National Stock Exchange (NSE):** It was promoted by leading Financial Institutions at the behest of the Government of India and was incorporated in November 1992. It uses satellite communication technology to energize participation from around 320 cities spread all over the country. NSE can handle up to 6 million trades per day in Capital Market segment. NSE is

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one of the largest interactive VSAT based stock exchanges in the world. Today it supports more than 3000 VSATs.

5. Leading Stock Exchanges Abroad

- (a) *New York Stock Exchange (NYSE)*: was established in 1792. Each day on the NYSE trading floor an auction takes place. Open bid and offers are managed on The Trading Floor by Exchange members acting on behalf of institutions and individual investors. Buy and sell orders for each listed security meet directly on the trading floor in assigned locations. Prices are determined through supply and demand. Stocks buy and sell orders funnel through a single location, ensuring that the investor, no matter how big or small, is exposed to a wide range of buyers and sellers.
- (b) *Nasdaq*: It is known for its growth, liquidity, depth of market and the world's most powerful, forward-looking technologies. It is the world's first electronic stock market. Nasdaq has no single specialist through which transactions pass. Nasdaq's market structure allows multiple market participants to trade stock through a sophisticated computer network linking buyers and sellers from around the world.
- (c) *London Stock Exchange*: Established in 1760. Dealing in shares is conducted via an off-market trading facility operated by Cazenovia and Company. The exchange also undertakes various investor-friendly programmes. One of them is the Share Aware Programme.

6. Functions of Stock Exchanges

- (a) Liquidity and Marketability of Securities;
- (b) Fair Price Determination;
- (c) Source for Long term Funds;
- (d) Helps in Capital Formation; and
- (e) Reflects the General State of Economy.

7. Green Shoe Option (GSO)

GSO means an option of allocating shares in excess of shares included in the public issue and operating a post listing price stability mechanism through a Stabilizing Agent (SA).

8. Clearing Houses

Clearing house is an exchange-associated body charged with the function of ensuring (guaranteeing) the financial integrity of each trade. It provides a range of

services related to the guarantee of contracts, clearance and settlement of trades, and management of risk for their members and associated exchanges.

9. 100% Book Building Process

In an issue of securities to the public through a prospectus, the option for 100% book building is available to any issuer company.

10. E-IPO

In addition to other requirements for public issue as given in SEBI guidelines wherever applicable, a company proposing to issue capital to public through the on-line system of the stock exchange for offer of securities has to comply with additional requirements in this regard.

For E-IPO, the company should enter into agreement with the stock exchange(s) and the stock exchange would appoint SEBI registered stock brokers of the stock exchange to accept applications.

11. Capital Market Instruments

- **Equity Shares:** It is a share in the ownership of a company. Stock represents a claim on the company's assets and earnings. It entitles the owner to vote at shareholders' meetings and to receive dividends.
- **Preference Shares:** They do not have voting rights, but have a higher claim on assets and earnings than the equity shares.
- **Debentures/ Bonds:** A bond is a long-term debt security. It represents "debt" in that the bond buyer actually lends the face amount to the bond issuer.

$$YTM = \frac{\text{Coupon Rate} + \text{Prorated Discount}}{(\text{Face Value} + \text{Purchase Price})/2}$$

- **American Depositary Receipts (ADRs):** An American Depositary Receipt (ADR) is a negotiable receipt which represents one or more depository shares held by a US custodian bank, which in turn represent underlying shares of non-issuer held by a custodian in the home country.
- **Global Depositary Receipts (GDRs):** They are negotiable certificates with publicly traded equity of the issuer as underlying security. An issue of depository receipts would involve the issuer, issuing agent to a foreign depository. The depository, in turn, issues GDRs to investors evidencing their rights as shareholders. Depository receipts are denominated in foreign currency and are listed on an international exchange such as London or Luxembourg. GDRs enable investors to trade a dollar denominated instrument on an international stock exchange and yet have rights in foreign shares.

- Derivatives: It is a financial instrument which derives its value from some other financial price. This 'other financial price' is called *the underlying*.

12. Types of Risks

- (a) Credit risk: Credit risk is the risk of loss due to counterparty's failure to perform on an obligation to the institution.
- (b) Market risk: Market risk is the risk of loss due to adverse changes in the market value (the price) of an instrument or portfolio of instruments.
- (c) Liquidity risk: Liquidity risk is the risk of loss due to failure of an institution to meet its funding requirements or to execute a transaction at a reasonable price.
- (d) Operational risk: Operational risk is the risk of loss occurring as a result of inadequate systems and control, deficiencies in information systems, human error, or management failure.
- (e) Legal risk: Legal risk is the risk of loss arising from contracts which are not legally enforceable (e.g. the counterparty does not have the power or authority to enter into a particular type of derivatives transaction) or documented correctly.
- (f) Regulatory risk: Regulatory risk is the risk of loss arising from failure to comply with regulatory or legal requirements.
- (g) Reputation risk: Reputation risk is the risk of loss arising from adverse public opinion and damage to reputation.

13. Types of Financial Derivatives

- Future Contract: It is an agreement between two parties that commits one party to buy an underlying financial instrument (bond, stock or currency) or commodity (gold, soybean or natural gas) and one party to sell a financial instrument or commodity at a specific price at a future date.
- Stock Options: A privilege, sold by one party to another, that gives the buyer right not an obligation, to buy (call) or sell (put) a stock at an agreed upon price within a certain period on or a specific date regardless of changes in its market price during that period.
- Stock Index Futures: Stock index futures may be used to either speculate on the equity market's general performance or to hedge a stock portfolio against a decline in value.

- **Stock Index Option:** A call or put option on a financial index. Investors trading index options are essentially betting on the overall movement of the stock market as represented by a basket of stocks.

14. Option Valuation Techniques

- (a) **Black-Scholes Model:** The Black-Scholes model is used to calculate a theoretical price (ignoring dividends paid during the life of the option) using the five key determinants of an option's price: stock price, strike price, volatility, time to expiration, and short-term (risk free) interest rate.

$$OP = SN(d_1) - Xe^{-rt}N(d_2)$$

Where:

$$d_1 = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{v^2}{2}\right)t}{v\sqrt{t}}$$

$$d_2 = d_1 - v\sqrt{t}$$

- (b) **Binomial Model:** The binomial model breaks down the time to expiration into potentially a very large number of time intervals, or steps. With the binomial model it is possible to check at every point in an option's life (i.e. at every step of the binomial tree) for the possibility of early exercise (e.g. where, due to e.g. a dividend, or a put being deeply in the money the option price at that point is less than its intrinsic value).
- (c) **Greeks:** The Greeks are a collection of statistical values (expressed as percentages) that give the investor a better overall view of how a stock has been performing :
- (i) **Delta:** It is the degree to which an option price will move given a small change in the underlying stock price. A deeply out-of-the-money call will have a delta very close to zero; a deeply in-the-money call will have a delta very close to 1.
- The formula for a delta of a European call on a non-dividend paying stock is:
- Delta = $N(d_1)$ (see Black-Scholes formula for d_1)
- (ii) **Gamma:** It measures how fast the delta changes for small changes in the underlying stock price. It is the delta of the delta.
- (iii) **Theta:** The change in option price given a one day decrease in time to expiration. It is a measure of time decay.

(iv) *Rho*: The change in option price given a one per centage point change in the risk-free interest rate.

(v) *Vega*: Sensitivity of option value to change in volatility.

(d) Pricing Future Contract

Cost-of-Carry Model: It is an arbitrage-free pricing model. Its central theme is that futures contract is so priced as to preclude arbitrage profit.

Futures price = Spot Price + Carry Cost – Carry Return

15. Embedded Derivatives

It is a derivative instrument that is embedded in another contract - the host contract. The host contract might be a debt or equity instrument, a lease, an insurance contract or a sale or purchase contract.

16. Commodity Derivatives

Trading in derivatives first started to protect farmers from the risk of the value of their crop going below the cost price of their produce. Derivative contracts were offered on various agricultural products like cotton, rice, coffee, wheat, pepper, etc. Commodity futures and swaps are also available.

There are 25 commodity derivative exchanges in India as of now and derivative contracts on nearly 100 commodities are available for trade.

17. Commodity Exchanges in India

(a) National Commodity & Derivatives Exchange Limited (NCDEX): NCDEX is a public limited company incorporated on April 23, 2003 under the Companies Act, 1956. It is the only commodity exchange in the country promoted by national level institutions. NCDEX is regulated by Forward Market Commission in respect of futures trading in commodities.

(b) Multi Commodity Exchange (MCX): MCX is an independent and de-mutualised multi commodity exchange. It has permanent recognition from the Government of India for facilitating online trading, clearing and settlement operations for commodities futures market across the country.

(c) National Board of Trade (NBOT): It is incorporated on July 30, 1999 to offer integrated, state-of-the-art commodity futures exchange.

(d) National Multi-Commodity Exchange of India (NMCE): It is the first de-mutualised Electronic Multi-Commodity Exchange of India granted the National status on a permanent basis by the Government of India and operational since 26th November 2002.

18. OTC Derivatives

It is a derivative contract which is privately negotiated. OTC trades have no anonymity, and they generally do not go through a clearing corporation.

- OTC Interest Rate Derivatives: Over-the-counter (OTC) interest rate derivatives include instruments such as forward rate agreements (FRAs), interest rate swaps, caps, floors, and collars.
- FRA: It is a forward contract that sets terms for the exchange of cash payments based on changes in the London Interbank Offered Rate (LIBOR).

Final settlement of the amounts owed by the parties to an FRA is determined by the formula

$$\text{Payment} = (N) (\text{LIBOR} - \text{FR}) (\text{dtm}/360) / 1 + \text{LIBOR} (\text{dtm}/360),$$

- Interest rate swaps: They provide for the exchange of payments based on differences between two different interest rates;
- Interest rate caps, floors, and collars: They are option-like agreements that require one party to make payments to the other when a stipulated interest rate, most often a specified maturity of LIBOR, moves outside of some predetermined range.

Question 1

Write short note on Green shoe option.

Answer

Green Shoe Option: It is an option that allows the underwriting of an IPO to sell additional shares if the demand is high. It can be understood as an option that allows the underwriter for a new issue to buy and resell additional shares upto a certain pre-determined quantity.

Looking to the exceptional interest of investors in terms of over-subscription of the issue, certain provisions are made to issue additional shares or bonds to underwriters for distribution. The issuer authorises for additional shares or bonds. In common parlance, it is the retention of over-subscription to a certain extent. It is a special feature of euro-issues. In euro-issues the international practices are followed.

In the Indian context, green shoe option has a limited connotation. SEBI guidelines governing public issues contain appropriate provisions for accepting over-subscriptions, subject to a ceiling, say, 15 per cent of the offer made to public. In certain situations, the green-shoe option can even be more than 15 per cent.

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Examples:

- IDBI had come-up earlier with their Flexi bonds (Series 4 and 5). This is a debt-instrument. Each of the series was initially floated for Rs. 750 crores. SEBI had permitted IDBI to retain an excess of an equal amount of Rs. 750 crores.
- ICICI had launched their first tranche of safety bonds through unsecured redeemable debentures of Rs. 200 crores, with a green shoe option for an identical amount.

More recently, Infosys Technologies has exercised the green shoe option to purchase upto 7,82,000 additional ADSs representing 3,91,000 equity shares. This offer initially involved 5.22 million depository shares, representing 2.61 million domestic equity shares.

Question 2

Write a note about the functions of merchant bankers.

Answer

Functions of Merchant Bankers

The basic function of merchant banker or investment banker is marketing of corporate and other securities. In the process, he performs a number of services concerning various aspects of marketing, viz., origination, underwriting, and distribution, of securities. During the regime of erstwhile Controller of Capital Issues in India, when new issues were priced at a significant discount to their market prices, the merchant banker's job was limited to ensuring press coverage and dispatching subscription forms to every corner of the country. Now, merchant bankers are designing innovative instruments and perform a number of other services both for the issuing companies as well as the investors. The activities or services performed by merchant bankers, in India, today include:

- (a) Project promotion services.
- (b) Project finance.
- (c) Management and marketing of new issues.
- (d) Underwriting of new issues.
- (e) Syndication of credit.
- (f) Leasing services.
- (g) Corporate advisory services.
- (h) Providing venture capital.
- (i) Operating mutual funds and off shore funds.

- (j) Investment management or portfolio management services.
- (k) Bought out deals.
- (l) Providing assistance for technical and financial collaborations and joint ventures.
- (m) Management of and dealing in commercial paper.
- (n) Investment services for non-resident Indians.

Question 3

Write short note on Advantages of a depository system.

Answer

Advantages of a Depository System

The different stake-holders have advantages flowing out of the depository system. They are:-

- (I) For the Capital Market:
 - (i) It eliminates bad delivery;
 - (ii) It helps to eliminate voluminous paper work;
 - (iii) It helps in the quick settlement of dues and also reduces the settlement time;
 - (iv) It helps to eliminate the problems concerning odd lots;
 - (v) It facilitates stock-lending and thus deepens the market.
- (II) For the Investor:
 - (i) It reduces the risks associated with the loss or theft of documents and securities and eliminates forgery;
 - (ii) It ensures liquidity by speedy settlement of transactions;
 - (iii) It makes investors free from the physical holding of shares;
 - (iv) It reduces transaction costs; and
 - (v) It assists investors in securing loans against the securities.
- (III) For the Corporate Sector or Issuers of Securities:
 - (i) It provides upto date information on shareholders' names and addresses;
 - (ii) It enhances the image of the company;
 - (iii) It reduces the costs of the secretarial department;
 - (iv) It increases the efficiency of registrars and transfer agents; and
 - (v) It provides better facilities of communication with members.

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Question 4

Write short note on Asset Securitisation.

Answer

Asset Securitisation: Securitisation is a process of transformation of illiquid asset into security which may be traded later in the open market. It is the process of transformation of the assets of a lending institution into negotiable instruments. The term 'securitisation' refers to both switching away from bank intermediation to direct financing via capital market and/or money market, and the transformation of a previously illiquid asset like automobile loans, mortgage loans, trade receivables, etc. into marketable instruments.

This is a method of recycling of funds. It is beneficial to financial intermediaries, as it helps in enhancing lending funds. Future receivables, EMIs and annuities are pooled together and transferred to an special purpose vehicle (SPV). These receivables of the future are shifted to mutual funds and bigger financial institutions. This process is similar to that of commercial banks seeking refinance with NABARD, IDBI, etc.

Question 5

Write a note on buy-back of shares by companies.

Answer

Buyback of shares:

Till 1998, buyback of equity shares was not permitted in India. But now they are permitted after suitably amending the Companies Act, 1956. However, the buy back of shares in India are permitted under certain guidelines issued by the Government as well as by the SEBI. Several companies have opted for such buyback including Reliance, Bajaj, and Ashok Leyland to name a few. In India, the corporate sector generally chooses to buyback by the tender method or the open market purchase method. The company, under the tender method, offers to buy back shares at a specific price during a specified period which is usually one month. Under the open market purchase method, a company buys shares from the secondary market over a period of one year subject to a maximum price fixed by the management. Companies seem to now have a distinct preference for the open market purchase method as it gives them greater flexibility regarding time and price.

As impact of buyback, the P/E ratio may change as a consequence of buyback operation. The P/E ratio may rise if investors view buyback positively or it may fall if the investors regard buyback negatively.

Rationale of buyback: Range from various considerations. Some of them may be:

- (i) For efficient allocation of resources.

- (ii) For ensuring price stability in share prices.
- (iii) For taking tax advantages.
- (iv) For exercising control over the company.
- (v) For saving from hostile takeover.
- (vi) To provide capital appreciation to investors this may otherwise be not available.

This, however, has some disadvantages also like, manipulation of share prices by its promoters, speculation, collusive trading etc.

Question 6

Write a short note on 'Book building'.

Answer

Book Building: Book building is a technique used for marketing a public offer of equity shares of a company. It is a way of raising more funds from the market. After accepting the free pricing mechanism by the SEBI, the book building process has acquired too much significance and has opened a new lead in development of capital market.

A company can use the process of book building to fine tune its price of issue. When a company employs book building mechanism, it does not pre-determine the issue price (in case of equity shares) or interest rate (in case of debentures) and invite subscription to the issue. Instead it starts with an indicative price band (or interest band) which is determined through consultative process with its merchant banker and asks its merchant banker to invite bids from prospective investors at different prices (or different rates). Those who bid are required to pay the full amount. Based on the response received from investors the final price is selected. The merchant banker (called in this case Book Runner) has to manage the entire book building process. Investors who have bid a price equal to or more than the final price selected are given allotment at the final price selected. Those who have bid for a lower price will get their money refunded.

In India, there are two options for book building process. One, 25 per cent of the issue has to be sold at fixed price and 75 per cent is through book building. The other option is to split 25 per cent of offer to the public (small investors) into a fixed price portion of 10 per cent and a reservation in the book built portion amounting to 15 per cent of the issue size. The rest of the book-built portion is open to any investor.

The greatest advantage of the book building process is that this allows for price and demand discovery. Secondly, the cost of issue is much less than the other traditional methods of raising capital. In book building, the demand for shares is known before the issue closes. In fact, if there is not much demand the issue may be deferred and can be rescheduled after having realised the temper of the market.

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Question 7

Write short note on Stock Lending Scheme.

Answer

Stock Lending: In 'stock lending', the legal title of a security is temporarily transferred from a lender to a borrower. The lender retains all the benefits of ownership, other than the voting rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits.

A securities lending programme is used by the lenders to maximize yields on their portfolio. Borrowers use the securities lending programme to avoid settlement failures.

Securities lending provide income opportunities for security-holders and creates liquidity to facilitate trading strategies for borrowers. It is particularly attractive for large institutional shareholders as it is an easy way of generating income to offset custody fees and requires little involvement of time. It facilitates timely settlement, increases the settlements, reduces market volatility and improves liquidity.

The borrower deposits collateral securities with the approved, intermediary. In case the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it. In the event of default, the approved intermediary is liable for making good the loss caused to the lender. The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

Current Status in India

National Securities Clearing Corporation Ltd. launched its stock lending operations (christened Automated Lending & Borrowing Mechanism – ALBM) on February 10, 1999. This was the beginning of the first real stock lending operation in the country. Stock Holding Corporation of India, Deutsche Bank and Reliance are the other three stock lending intermediaries registered with SEBI.

Under NSCCL system only dematerialized stocks are eligible. The NSCCL'S stock lending system is screen based, thus instantly opening up participation from across the country wherever there is an NSE trading terminal. The transactions are guaranteed by NSCCL and the participating members are the clearing members of NSCCL. The main features of NSCCL system are:

- (i) The session will be conducted every Wednesday on NSE screen where borrowers and lenders enter their requirements either as a purchase order indicating an intention to borrow or as sale, indicating intention to lend.
- (ii) Previous day's closing price of a security will be taken as the lending price of the security.

- (iii) The fee or interest that a lender gets will be market determined and will be the difference between the lending price and the price arrived at the ALBM session.
- (iv) Corresponding to a normal market segment, there will be an ALBM session.
- (v) Funds towards each borrowing will have to be paid in on the securities lending day.
- (vi) A participant will be required to pay-in-funds equal to the total value of the securities borrowed.
- (vii) The same amount of securities has to be returned at the end of the ALBM settlement on the day of the pay-out of the ALBM settlement.
- (viii) The previous day's closing price is called the lending price and the rate at which the lending takes place is called the lending fee. This lending fee alone is determined in the course of ALBM session.
- (ix) Fee adjustment shall be made for any lender not making full delivery of a security. The lender's account shall be debited for the quantity not delivered.
- (x) The borrower account shall be debited to the extent of the securities not lend on account of funds shortage.

Question 8

- (a) *Briefly explain 'Buy Back of Securities' and give the management objectives of buying Back Securities.*
- (b) *Explain the term 'Insider Trading' and why Insider Trading is punishable.*

Answer

(a) Buy Back of Securities

Companies are allowed to buy back equity shares or any other security specified by the Union Government. In India Companies are required to extinguish shares bought back within seven days. In USA Companies are allowed to hold bought back shares as treasury stock, which may be reissued. A company buying back shares makes an offer to purchase shares at a specified price. Shareholders accept the offer and surrender their shares.

The following are the management objectives of buying back securities:

- (i) To return excess cash to shareholders, in absence of appropriate investment opportunities.
- (ii) To give a signal to the market that shares are undervalued.

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(iii) To increase promoters holding, as a percentage of total outstanding shares, without additional investment. Thus, buy back is often used as a defence mechanism against potential takeover.

(iv) To change the capital structure.

(b) Insider Trading

Insider Trading is a buying or selling or dealing in securities of a listed company, by a director, member of management, an employee or any other person such as internal or statutory auditor, agent, advisor, analyst consultant etc. who have knowledge of material, 'inside' information not available to general public. The dealing in securities by an insider is illegal when it is predicated upon utilization of inside information to profit at the expense of other investors who do not have access to such investment information. The word insider has wide connotation. An outsider may be held to be an insider by virtue of his engaging himself in this practice on the strength of inside information.

Insider trading which is an unethical practice resorted to by those in power in corporates has manifested not only in India but elsewhere in the world causing huge losses to common investors thus driving them away from capital market. Therefore, it is punishable.

Question 9

Explain the term "Offer for Sale".

Answer

Offer for sale is also known as bought out deal (BOD). It is a new method of offering equity shares, debentures etc., to the public. In this method, instead of dealing directly with the public, a company offers the shares/debentures through a sponsor. The sponsor may be a commercial bank, merchant banker, an institution or an individual. It is a type of wholesale of equities by a company. A company allots shares to a sponsor at an agreed price between the company and sponsor. The sponsor then passes the consideration money to the company and in turn gets the shares duly transferred to him. After a specified period as agreed between the company and sponsor, the shares are issued to the public by the sponsor with a premium. After the public offering, the sponsor gets the shares listed in one or more stock exchanges. The holding cost of such shares by the sponsor may be reimbursed by the company or the sponsor may get the profit by issue of shares to the public at premium.

Thus, it enables the company to raise the funds easily and immediately. As per SEBI guidelines, no listed company can go for BOD. A privately held company or an unlisted company can only go for BOD. A small or medium size company which needs money urgently chooses to BOD. It is a low cost method of raising funds. The cost of public issue is around 8% in India. But this method lacks transparency. There will be scope for misuse also. Besides this, it is expensive like

the public issue method. One of the most serious short coming of this method is that the securities are sold to the investing public usually at a premium. The margin thus between the amount received by the company and the price paid by the public does not become additional funds of the company, but it is pocketed by the issuing houses or the existing shareholders.

Question 10

Write short notes on the following:

1. *Debt Securitisation.*
2. *Stock Lending Scheme – its meaning, advantages and risk involved.*

Answer

(1) Debt Securitisation:

Debt securitisation is a method of recycling of funds. It is especially beneficial to financial intermediaries to support the lending volumes. Assets generating steady cash flows are packaged together and against this assets pool market securities can be issued. The process can be classified in the following three functions.

1. *The origination function:* A borrower seeks a loan from finance company, bank or housing company. On the basis of credit worthiness repayment schedule is structured over the life of the loan.
2. *The pooling function:* Similar loans or receivables are clubbed together to create an underlying pool of assets. This pool is transferred in favour of a SPV (Special Purpose Vehicle), which acts as a trustee for the investor. Once, the assets are transferred they are held in the organizers portfolios.
3. *The securitisation function:* It is the SPV's job to structure and issue the securities on the basis of asset pool. The securities carry coupon and an expected maturity, which can be asset based or mortgage based. These are generally sold to investors through merchant bankers. The investors interested in this type of securities are generally institutional investors like mutual fund, insurance companies etc. The originator usually keeps the spread.

Generally, the process of securitisation is without recourse i.e. the investor bears the credit risk of default and the issuer is under an obligation to pay to investors only if the cash flows are received by issuer from the collateral.

(2) Stock Lending Scheme:

Stock lending means transfer of security. The legal title is temporarily transferred from a lender to a borrower. The lender retains all the benefits of ownership, except voting

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power/rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits such as dividends, rights etc. The basic purpose of stock borrower is to cover the short sales i.e. selling the shares without possessing them. SEBI has introduced scheme for securities lending and borrowing in 1997.

Advantages:

- (1) Lenders to get return (as lending charges) from it, instead of keeping it idle.
- (2) Borrower uses it to avoid settlement failure and loss due to auction.
- (3) From the view-point of market this facilitates timely settlement, increase in settlement, reduce market volatility and improves liquidity.
- (4) This prohibits fictitious Bull Run.

The borrower has to deposit the collateral securities, which could be cash, bank guarantees, government securities or certificates of deposits or other securities, with the approved intermediary. In case, the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it.

In the event of default, the approved intermediary is liable for making good the loss caused to the lender.

The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

National Securities Clearing Corporation Ltd. (NSCCL), Stock Holding Corporation of India (SHCIL), Deutsche Bank, and Reliance Capital etc. are the registered and approved intermediaries for the purpose of stock lending scheme. NSCCL proposes to offer a number of schemes, including the Automated Lending and Borrowing Mechanism (ALBM), automatic borrowing for settlement failures and case by case borrowing.

Question 11

Explain the terms ESOS and ESPS with reference to the SEBI guidelines for The Employees Stock Option Plans (ESOPs).

Answer

ESOS and ESPS

	ESOS	ESPS
1. Meaning	Employee Stock Option Scheme means a scheme under which the company grants option to employees.	Employee Stock Purchase Scheme means a scheme under which the company offers shares to employees as a part of public issue.
2. Auditors' Certificate	Auditors' Certificate to be placed at each AGM stating that the scheme has been implemented as per the guidelines and in accordance with the special resolution passed.	No such Certificate is required.
3. Transferability	It is not transferable.	It is transferable after lock in period.
4. Consequences of failure	The amount payable may be forfeited. If the option is not vested due to non-fulfillment of condition relating to vesting of option then the amount may be refunded to the employees.	Not applicable.
5. Lock in period	Minimum period of 1 year shall be there between the grant and vesting of options. Company is free to specify the lock in period for the shares issued pursuant to exercise of option.	One year from the date of allotment. If the ESPS is part of public issue and the shares are issued to employees at the same price as in the public issue, the shares issued to employees pursuant to ESPS shall not be subject to any lock in.

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Question 12

Distinguish between:

- (i) *Forward and Futures contracts.*
(ii) *Intrinsic value and Time value of an option.*

Answer

(i) **Forward and Future Contracts:**

S.No.	Features	Forward	Futures
1.	Trading	Forward contracts are traded on personal basis or on telephone or otherwise.	Futures Contracts are traded in a competitive arena.
2.	Size of Contract	Forward contracts are individually tailored and have no standardized size	Futures contracts are standardized in terms of quantity or amount as the case may be
3.	Organized exchanges	Forward contracts are traded in an over the counter market.	Futures contracts are traded on organized exchanges with a designated physical location.
4.	Settlement	Forward contracts settlement takes place on the date agreed upon between the parties.	Futures contracts settlements are made daily via. Exchange's clearing house.
5.	Delivery date	Forward contracts may be delivered on the dates agreed upon and in terms of actual delivery.	Futures contracts delivery dates are fixed on cyclical basis and hardly takes place. However, it does not mean that there is no actual delivery.
6.	Transaction costs	Cost of forward contracts is based on bid – ask spread.	Futures contracts entail brokerage fees for buy and sell orders.
7.	Marking to market	Forward contracts are not subject to marking to market	Futures contracts are subject to marking to market in which the loss on profit is debited or credited in the margin account on daily basis due to change in price.
8.	Margins	Margins are not required in forward contract.	In futures contracts every participants is subject to maintain margin as decided by the

			exchange authorities
9.	Credit risk	In forward contract, credit risk is born by each party and, therefore, every party has to bother for the creditworthiness.	In futures contracts the transaction is a two way transaction, hence the parties need not to bother for the risk.

- (ii) **Intrinsic value and the time value of An Option:** Intrinsic value of an option and the time value of an option are primary determinants of an option's price. By being familiar with these terms and knowing how to use them, one will find himself in a much better position to choose the option contract that best suits the particular investment requirements.

Intrinsic value is the value that any given option would have if it were exercised today. This is defined as the difference between the option's strike price (x) and the stock actual current price (c.p). In the case of a call option, one can calculate the intrinsic value by taking $CP - X$. If the result is greater than Zero (In other words, if the stock's current price is greater than the option's strike price), then the amount left over after subtracting $CP - X$ is the option's intrinsic value. If the strike price is greater than the current stock price, then the intrinsic value of the option is zero – it would not be worth anything if it were to be exercised today. An option's intrinsic value can never be below zero. To determine the intrinsic value of a put option, simply reverse the calculation to $X - CP$

Example: Let us assume Wipro Stock is priced at Rs.105/-. In this case, a Wipro 100 call option would have an intrinsic value of $(Rs.105 - Rs.100 = Rs.5)$. However, a Wipro 100 put option would have an intrinsic value of zero $(Rs.100 - Rs.105 = -Rs.5)$. Since this figure is less than zero, the intrinsic value is zero. Also, intrinsic value can never be negative. On the other hand, if we are to look at a Wipro put option with a strike price of Rs.120. Then this particular option would have an intrinsic value of Rs.15 $(Rs.120 - Rs.105 = Rs.15)$.

Time Value: This is the second component of an option's price. It is defined as any value of an option other than the intrinsic value. From the above example, if Wipro is trading at Rs.105 and the Wipro 100 call option is trading at Rs.7, then we would conclude that this option has Rs.2 of time value $(Rs.7 \text{ option price} - Rs.5 \text{ intrinsic value} = Rs.2 \text{ time value})$. Options that have zero intrinsic value are comprised entirely of time value.

Time value is basically the risk premium that the seller requires to provide the option buyer with the right to buy/sell the stock upto the expiration date. This component may be regarded as the Insurance premium of the option. This is also known as "Extrinsic

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value." Time value decays over time. In other words, the time value of an option is directly related to how much time an option has until expiration. The more time an option has until expiration, greater the chances of option ending up in the money.

Question 13

What is the procedure for the book building process? Explain the recent changes made in the allotment process.

Answer

The modern and more popular method of share pricing these days is the BOOK BUILDING route. After appointing a merchant banker as a book runner, the company planning the IPO, specifies the number of shares it wishes to sell and also mentions a price band. Investors place their orders in Book Building process that is similar to bidding at an auction. The willing investors submit their bids above the floor price indicated by the company in the price band to the book runner. Once the book building period ends, the book runner evaluates the bids on the basis of the prices received, investor quality and timing of bids. Then the book runner and the company conclude the final price at which the issuing company is willing to issue the stock and allocate securities. Traditionally, the number of shares is fixed and the issue size gets determined on the basis of price per share discovered through the book building process.

Public issues these days are targeted at various segments of the investing fraternity. Companies now allot certain portions of the offering to different segments so that everyone gets a chance to participate. The segments are traditionally three -qualified institutional bidders (QIBs), high net worth individuals (HNIs) and retail investors (general public). Indian companies now have to offer about 50% of the offer to QIBs, about 15% to high net worth individuals and the remaining 35% to retail investors. Earlier retail and high net worth individuals had 25% each. Also the QIBs are allotted shares on a pro-rata basis as compared to the earlier norm when it was at the discretion of the company management and the investment bankers. These investors (QIB) also have to pay 10% margin on application. This is also a new requirement. Once the offer is completed, the company gets listed and investors and shareholders can trade the shares of the company in the stock exchange.

Question 14

Explain briefly the advantages of holding securities in 'demat' form rather than in physical form.

Answer**Advantages of Holding Securities in 'Demat' Form**

The Depositories Act, 1996 provides the framework for the establishment and working of depositories enabling transactions in securities in scripless (or demat) form. With the arrival of depositories on the scene, many of the problems previously encountered in the market due to physical handling of securities have been to a great extent minimized. In a broad sense, therefore, it can be said that 'dematting' has helped to broaden the market and make it smoother and more efficient.

From an individual investor point of view, the following are important advantages of holding securities in demat form:

- It is speedier and avoids delay in transfers.
- It avoids lot of paper work.
- It saves on stamp duty.

From the issuer-company point of view also, there are significant advantages due to dematting, some of which are:

- Savings in printing certificates, postage expenses.
- Stamp duty waiver.
- Easy monitoring of buying/selling patterns in securities, increasing ability to spot takeover attempts and attempts at price rigging.

Question 15

- (i) *What are Stock futures?*
- (ii) *What are the opportunities offered by Stock futures?*
- (iii) *How are Stock futures settled?*

Answer

- (i) Stock future is a financial derivative product where the underlying asset is an individual stock. It is also called equity future. This derivative product enables one to buy or sell the underlying Stock on a future date at a price decided by the market forces today.
- (ii) Stock futures offer a variety of usage to the investors. Some of the key usages are mentioned below:

Investors can take long-term view on the underlying stock using stock futures.

- (a) Stock futures offer high leverage. This means that one can take large position with less capital. For example, paying 20% initial margin one can

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take position for 100%, i.e., 5 times the cash outflow.

- (b) Futures may look over-priced or under-priced compared to the spot price and can offer opportunities to arbitrage and earn riskless profit.
 - (c) When used efficiently, single-stock futures can be effective risk management tool. For instance, an investor with position in cash segment can minimize either market risk or price risk of the under lying stock by taking reverse position in an appropriate futures contract.
- (iii) Up to March 31, 2002, stock futures were settled in cash. The final settlement price is the closing price of the underlying stock. From April 2002, stock futures are settled by delivery, i.e., by merging derivatives position into cash segment.

Question 16

- (i) *What are derivatives?*
- (ii) *Who are the users and what are the purposes of use?*
- (iii) *Enumerate the basic differences between cash and derivatives market.*

Answer

- (i) Derivative is a product whose value is to be derived from the value of one or more basic variables called bases (underlying assets, index or reference rate). The underlying assets can be Equity, Forex, and Commodity.

	Users	Purpose
(i)	Corporation	To hedge currency risk and inventory risk
(ii)	Individual Investors	For speculation, hedging and yield enhancement.
(iii)	Institutional Investor	For hedging asset allocation, yield enhancement and to avail arbitrage opportunities.
(iv)	Dealers	For hedging position taking, exploiting inefficiencies and earning dealer spreads.

The basic differences between Cash and the D erivative market are enumerated below:-

In cash market tangible assets are traded whereas in derivate markets contracts based on tangible or intangibles assets likes index or rates are traded.

- (a) In cash market tangible assets are traded whereas in derivative market contracts based on tangible or intangibles assets like index or rates are traded.

- (b) In cash market, we can purchase even one share whereas in Futures and Options minimum lots are fixed.
- (c) Cash market is more risky than Futures and Options segment because in "Futures and Options" risk is limited upto 20%.
- (d) Cash assets may be meant for consumption or investment. Derivate contracts are for hedging, arbitrage or speculation.
- (e) The value of derivative contract is always based on and linked to the underlying security. However, this linkage may not be on point-to-point basis.
- (f) In the cash market, a customer must open securities trading account with a securities depository whereas to trade futures a customer must open a future trading account with a derivative broker.
- (g) Buying securities in cash market involves putting up all the money upfront whereas buying futures simply involves putting up the margin money.
- (h) With the purchase of shares of the company in cash market, the holder becomes part owner of the company. While in future it does not happen.

Question 17

Write short note on Options.

Answer

Options: An option is a claim without any liability. It is a claim contingent upon the occurrence of certain conditions and, therefore, option is a contingent claim. More specifically, an option is contract that gives the holder a right, without any obligation, to buy or sell an asset at an agreed price on or before a specified period of time. The option to buy an asset is known as a call option and the option to sell an asset is called put option. The price at which option can be exercised is called as exercise price or strike price. Based on exercising the option it can be classified into two categories:

- (i) **European Option:** When an option is allowed to be exercised only on the maturity date.
- (ii) **American Option:** When an option is exercised any time before its maturity date.

When an option holder exercises his right to buy or sell it may have three possibilities.

- (a) An option is said to be in the money when it is advantageous to exercise it.
- (b) When exercise is not advantageous it is called out of the money.
- (c) When option holder does not gain or lose it is called at the money.

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The holder of an option has to pay a price for obtaining call/put option. This price is known as option premium. This price has to be paid whether the option is exercised or not.

Question 18

What is a "derivative"? Briefly explain the recommendations of the L.C. Gupta Committee on derivatives.

Answer

The derivatives are most modern financial instruments in hedging risk. The individuals and firms who wish to avoid or reduce risk can deal with the others who are willing to accept the risk for a price. A common place where such transactions take place is called the 'derivative market'.

Derivatives are those assets whose value is determined from the value of some underlying assets. The underlying asset may be equity, commodity or currency.

Based on the report of Dr. L.C. Gupta Committee the following recommendations are accepted by SEBI on Derivatives:

- Phased introduction of derivative products, with the stock index futures as starting point for equity derivative in India.
- Expanded definition of securities under the Securities Contracts (Regulation) Act (SCRA) by declaring derivative contracts based on index of prices of securities and other derivatives contracts as securities.
- Permission to existing stock exchange to trade derivatives provided they meet the eligibility conditions including adequate infrastructural facilities, on-line trading and surveillance system and minimum of 50 members opting for derivative trading etc.
- Initial margin requirements related to the risk of loss on the position and capital adequacy norms shall be prescribed.
- Annual inspection of all the members operating in the derivative segment by the Stock Exchange.
- Dissemination of information by the exchange about the trades, quantities and quotes in real time over at least two information vending networks.
- The clearing corporation/house to settle derivatives trades. This should meet certain specified eligibility conditions and the clearing corporation/house must interpose itself between both legs of every trade, becoming the legal counter party to both or alternatively provide an unconditional guarantee for settlement of all trades.

- Two tier membership: The trading member and clearing member, and the entry norms for the clearing member would be more stringent.
- The clearing member should have a minimum networth of Rs. 3 crores and shall make a deposit of Rs. 50 lakhs with the exchange/clearing corporation in the form of liquid assets.
- Prescription of a model Risk Disclosure Document and monitoring broker-dealer/client relationship by the Stock Exchange and the requirement that the sales personnel working in the broker-dealer office should pass a certification programme.
- Corporate clients/financial institutions/mutual funds should be allowed to trade derivatives only if and to the extent authorised by their Board of Directors/Trustees.
- Mutual Funds would be required to make necessary disclosures in their offer documents if they opt to trade derivatives. For the existing schemes, they would require the approval of their unit holders. The minimum contract value would be Rs. 1 lakh, which would also apply in the case of individuals.

Question 19

Write short note on Marking to market.

Answer

Marking to market: It implies the process of recording the investments in traded securities (shares, debt-instruments, etc.) at a value, which reflects the market value of securities on the reporting date. In the context of derivatives trading, the futures contracts are marked to market on periodic (or daily) basis. Marking to market essentially means that at the end of a trading session, all outstanding contracts are repriced at the settlement price of that session. Unlike the forward contracts, the future contracts are repriced every day. Any loss or profit resulting from repricing would be debited or credited to the margin account of the broker. It, therefore, provides an opportunity to calculate the extent of liability on the basis of repricing. Thus, the futures contracts provide better risk management measure as compared to forward contracts.

Suppose on 1st day we take a long position, say at a price of Rs. 100 to be matured on 7th day. Now on 2nd day if the price goes up to Rs. 105, the contract will be repriced at Rs. 105 at the end of the trading session and profit of Rs. 5 will be credited to the account of the buyer. This profit of Rs. 5 may be drawn and thus cash flow also increases. This marking to market will result in three things – one, you will get a cash profit of Rs. 5; second, the existing contract at a price of Rs. 100 would stand cancelled; and third you will receive a new futures contract at Rs. 105. In essence, the marking to market feature implies that the value of the futures contract is set to zero at the end of each trading day.

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Question 20

A share of Tension-free Economy Ltd. is currently quoted at, a price earnings ratio of 7.5 times. The retained earnings per share being 37.5% is Rs. 3 per share. Compute:

- (1) The company's cost of equity, if investors expect annual growth rate of 12%.
- (2) If anticipated growth rate is 13% p.a., calculate the indicated market price, with same cost of capital.
- (3) If the company's cost of capital is 18% and anticipated growth rate is 15% p.a., calculate the market price per share, assuming other conditions remain the same.

Answer

1. Calculation of cost of capital

Retained earnings	37.5%	Rs. 3 per share
Dividend*	62.5%	Rs. 5 per share
EPS	100.0%	Rs. 8 per share

P/E ratio 7.5 times

Market price is Rs. $7.5 \times 8 = \text{Rs. } 60$ per share

Cost of equity capital = $(\text{Dividend}/\text{price} \times 100) + \text{growth \%}$
 $= (5/60 \times 100) + 12\% = 20.33\%$.

$$* \frac{\text{Rs. } 3}{37.5} \times 62.5 = \text{Rs. } 5$$

2. Market price = $\text{Dividend}/(\text{cost of equity capital \%} - \text{growth rate \%}) = 5/(20.33\% - 13\%) = 5/7.33\% = \text{Rs. } 68.21$ per share.
3. Market price = $\text{Dividend}/(\text{cost of equity capital \%} - \text{growth rate \%}) = 5/(18\% - 15\%) = 5/3\% = \text{Rs. } 166.66$ per share.

Question 21

Following information is available in respect of dividend, market price and market condition after one year.

Market condition	Probability	Market Price	Dividend per share
		Rs.	Rs.
Good	0.25	115	9
Normal	0.50	107	5
Bad	0.25	97	3

The existing market price of an equity share is Rs. 106 (F.V. Re. 1), which is cum 10% bonus debenture of Rs. 6 each, per share. M/s. X Finance Company Ltd. had offered the buy-back of debentures at face value.

Find out the expected return and variability of returns of the equity shares.

And also advise-Whether to accept buy back after?

Answer

The Expected Return of the equity share may be found as follows:

Market Condition	Probability	Total Return	Cost (*)	Net Return
Good	0.25	Rs. 124	Rs. 100	Rs. 24
Normal	0.50	Rs. 112	Rs. 100	Rs. 12
Bad	0.25	Rs. 100	Rs. 100	Rs. 0

$$\text{Expected Return} = (24 \times 0.25) + (12 \times 0.50) + (0 \times 0.25)$$

$$= \frac{24 \times 0.25 + 12 \times 0.50 + 0 \times 0.25}{100} \times 100 = 12\%$$

The variability of return can be calculated in terms of standard deviation.

$$\begin{aligned} VSD &= 0.25 (24 - 12)^2 + 0.50 (12 - 12)^2 + 0.25 (0 - 12)^2 \\ &= 0.25 (12)^2 + 0.50 (0)^2 + 0.25 (-12)^2 \\ &= 36 + 0 + 36 \end{aligned}$$

$$SD = \sqrt{72}$$

$$SD = 8.485 \text{ or say } 8.49$$

(*) The present market price of the share is Rs. 106 cum bonus 10% debenture of Rs. 6 each; hence the net cost is Rs. 100 (There is no cash loss or any waiting for refund of debenture amount).

M/s X Finance company has offered the buyback of debenture at face value. There is reasonable 10% rate of interest compared to expected return 12% from the market. Considering the dividend rate and market price the creditworthiness of the company seems to be very good. The decision regarding buy-back should be taken considering the maturity period and opportunity in the market. Normally, if the maturity period is low say up to 1 year better to wait otherwise to opt buy back option.

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Question 22

The market received rumour about ABC corporation's tie-up with a multinational company. This has induced the market price to move up. If the rumour is false, the ABC corporation stock price will probably fall dramatically. To protect from this an investor has bought the call and put options.

He purchased one 3 months call with a striking price of Rs.42 for Rs.2 premium, and paid Re.1 per share premium for a 3 months put with a striking price of Rs.40.

- (i) *Determine the Investor's position if the tie up offer bids the price of ABC Corporation's stock up to Rs.43 in 3 months.*
- (ii) *Determine the Investor's ending position, if the tie up programme fails and the price of the stocks falls to Rs.36 in 3 months.*

Answer

Cost of Call and Put Options

$$= (\text{Rs.2 per share}) \times (100 \text{ share call}) + (\text{Re.1 per share}) \times (100 \text{ share put})$$

$$= \text{Rs.2} \times 100 + 1 \times 100$$

$$= \text{Rs.300}$$

- (i) Price increases to Rs.43. Since the market price is higher than the strike price of the put, the investor will exercise it.

$$\begin{aligned} \text{Ending position} &= (-\text{Rs.300 cost of option}) + (\text{Re.1 per share gain on call}) \times 100 \\ &= -\text{Rs.300} + 100 \end{aligned}$$

$$\text{Net Loss} = \text{Rs.200}$$

- (ii) The price of the stock falls to Rs.36. Since the market price is lower than the strike price, the investor may not exercise the call option.

$$\begin{aligned} \text{Ending Position:} &= (-\text{Rs.300 cost of 2 option}) + (\text{Rs.4 per stock gain on put}) \times 100 \\ &= -\text{Rs.300} + 400 \end{aligned}$$

$$\text{Gain} = \text{Rs.100}$$

Question 23

Abhishek Ltd. has a surplus cash of Rs.90 lakhs and wants to distribute 30% of it to the shareholders. The Company decides to buyback shares. The Finance Manager of the Company estimates that its share price after re-purchase is likely to be 10% above the buyback price; if the buyback route is taken. The number of shares outstanding at present is 10 lakhs and the current EPS is Rs.3.

You are required to determine:

- (a) The price at which the shares can be repurchased, if the market capitalization of the company should be Rs.200 lakhs after buyback.
- (b) The number of shares that can be re-purchased.
- (c) The impact of share re-purchase on the EPS, assuming the net income is same.

Answer

- (a) Let P be the buyback price decided by Abhishek Ltd.

Market Capitalisation After Buyback:

1.1 P (Original Shares – Shares Bought back)

$$= \frac{₹}{₹} 1.1P (10 \text{ Lakhs} - \frac{30\% \text{ of } 90 \text{ lakhs}}{P})$$

$$= 11 \text{ Lakhs} \times P - 27 \text{ lakhs} \times 1.1$$

$$= 11 \text{ lakhs} \times P - 29.7 \text{ lakhs}$$

Market capitalization rate after buyback is 200 lakhs.

Thus, we have:

$$11 \text{ Lakhs} \times P - 29.7 \text{ lakhs} = \text{Rs.}200 \text{ lakhs}$$

$$\text{OR } 11P = 200 + 29.7$$

$$\text{OR } P = \frac{229.7}{11} = \text{Rs.}20.88$$

- (b) Number of shares to be bought back:

$$= \frac{27 \text{ Lakhs}}{20.88} = 1.29 \text{ lakhs (Approximately)}$$

- (c) New Equity Shares

$$= (10 - 1.29) \text{ lakhs} = 8.71 \text{ lakhs}$$

$$\text{EPS} = \frac{₹ 10 \text{ lakhs}}{8.71 \text{ lakhs}} = \frac{₹ 30 \text{ L}}{8.71 \text{ L}} = \text{Rs.}3.44$$

Thus EPS of Abhishek Ltd., increases to Rs.3.44

Strategic Financial Management

Question 24

From the following data for certain stock, find the value of a call option:

Price of stock now	=	Rs.80
Exercise price	=	Rs.75
Standard deviation of continuously compounded annual return	=	0.40
Maturity period	=	6 months
Annual interest rate	=	12%

Given

Number of S.D. from Mean, (z)	Area of the left or right (one tail)
0.25	0.4013
0.30	0.3821
0.55	0.2912
0.60	0.2578

$$e^{0.12 \times 0.05} = 1.0060$$

$$\ln 1.0667 = 0.0645$$

Answer

Applying the Black Scholes Formula,

Value of the Call option now:

$$\text{The Formula } C = SN(d_1) - K e^{(-rt)} N(d_2)$$

$$d_1 = \ln(S/K) + (r + s^2/2)t$$

$$d_2 = d_1 - s\sqrt{t}$$

Where,

C = Theoretical call premium

S = Current stock price

t = time until option expiration

K = option striking price

r = risk-free interest rate

N = Cumulative standard normal distribution

e = exponential term

s = Standard deviation of continuously compounded annual return.

$\ln$ = natural logarithm

$$d_1 = \frac{\ln(1.0667) + (12\% + (0.08)^{0.5})}{.40\sqrt{0.5}}$$

$$= \frac{0.0645 + (0.2)^{0.5}}{0.40 \times 0.7071}$$

$$= \frac{0.1645}{0.2828}$$

$$= 0.5817$$

$$d_2 = 0.5817 - 0.2828$$

$$= 0.2989$$

$$Nd_1 = N(0.5817)$$

$$Nd_2 = N(0.2989)$$

$$\text{Price} = S_0 N(d_1) - \frac{E}{e^{rt} \times N(d_2)}$$

$$= (80 \times Nd_1) - 75/[1.0060 \times N[d_2]]$$

Value of option

$$= 80 Nd_1 - \frac{75}{1.0060 \times Nd_2}$$

$$Nd_1 = N(0.5817)$$

$$= 0.7190 + 0.000578$$

$$= 0.7195$$

$$Nd_2 = N(0.2989)$$

$$= 0.6141 + 0.003382$$

$$= 0.6175$$

Strategic Financial Management

$$\begin{aligned}
 \text{Price} &= 80 \times 0.7195 - \frac{75}{1.0060 \times 0.6175} \\
 &= 57.56 - 74.55 \times 0.6175 \\
 &= 57.56 - 46.04 \\
 &= \text{Rs.}11.52
 \end{aligned}$$

Question 25

The 6-months forward price of a security is Rs.208.18. The borrowing rate is 8% per annum payable with monthly rests. What should be the spot price?

Answer

Calculation of spot price

The formula for calculating forward price is:

$$A = P (1 + r/n)^{nt}$$

Where

A = Forward price

P = Spot Price

r = rate of interest

n = no. of compoundings

t = time

Using the above formula,

$$208.18 = P (1 + 0.08/12)^6$$

$$\text{Or } 208.18 = P \times 1.0409$$

$$P = 208.18 / 1.0409 = 200$$

Hence, the spot price should be Rs.200.

Question 26

BSE	500
Value of portfolio	Rs.10,10,000
Risk free interest rate	9% p.a.
Dividend yield on Index	6% p.a.
Beta of portfolio	1.5

We assume that a future contract on the BSE index with four months maturity is used to hedge the value of portfolio over next three months. One future contract is for delivery of 50 times the index.

Based on the above information calculate:

- (i) Price of future contract.
- (ii) The gain on short futures position if index turns out to be 4,500 in three months.

Answer

$$(i) \quad \text{Current future price of the index} = 5000 + 5000 (0.09 - 0.06) \frac{4}{12} = 5000 + 50 = 5,050$$

$$\backslash \quad \text{Price of the future contract} = \text{Rs.} 50 \times 5,050 = \text{Rs.} 2,52,500$$

$$(ii) \quad \text{Hedge ratio} = \frac{10,10,000}{252,500} \times 1.5 = 6 \text{ contracts}$$

Index after three months turns out to be 4500

$$\text{Future price will be} = 4500 + 4500 (0.09 - 0.06) \times \frac{1}{3} = 4,545$$

$$\begin{aligned} \text{Therefore, Gain from the short futures position is} &= 6 \times (5050 - 4545) \times 50 \\ &= \text{Rs.} 1,51,500 \end{aligned}$$

Alternative solution when BSE index is considered to be as 500

$$(i) \quad \text{Current future price of index} = 500 + 500 (0.09 - 0.06) \frac{4}{12} = 500 + 5 = 505$$

$$\backslash \quad \text{Price of the future contract} = \text{Rs.} 50 \times 505 = \text{Rs.} 25,250.$$

$$(ii) \quad \text{Hedge Ratio} = \frac{10,10,000}{25,250} \times 1.5 = 60 \text{ contracts}$$

Index after three months turn out to be 4,500.

Future Price will be

$$= 4,500 + 4,500 (0.09 - 0.06) \times \frac{1}{3} = 4,545$$

Therefore, gain from the short future position is

$$\begin{aligned} &= 60 \times (505 - 4545) \times 50 \\ &= -12,12,00,00. \end{aligned}$$

Strategic Financial Management

Question 27

From the following data for Government securities, calculate the forward rates:

Face value (Rs.)	Interest rate	Maturity (Year)	Current price (Rs.)
1,00,000	0%	1	91,500
1,00,000	10%	2	98,500
1,00,000	10.5%	3	99,000

Answer

Consider one-year Treasury bill.

$$91,500 = \frac{1,00,000}{1+r_1}$$

$$1+r_1 = \frac{1,00,000}{91,500} = 1.092896$$

$$r_1 = 0.0929 \text{ or } 0.093$$

Consider two-year Government Security

$$98,500 = \frac{10,000}{1.093} + \frac{1,10,000}{(1.093)(1+r_2)}$$

$$98,500 = 9,149.131 + \frac{1,10,000}{1.093(1+r_2)}$$

$$\Rightarrow 89,350.87 = \frac{1,00,640.4}{1+r_2}$$

$$\Rightarrow 1+r_2 = \frac{1,00,640.4}{89,350.87} = 1.126351$$

$$r_2 = 0.12635$$

$$\Rightarrow r_2 = 0.1263$$

Consider three-year Government Securities:

$$99,000 = \frac{10,500}{1.093} + \frac{10,500}{1.093 \times 1.1263} + \frac{1,10,500}{1.093 \times 1.1263(1+r_3)}$$

$$\Rightarrow 99,000 = 9,606.587 + 8,529.65 + \frac{89,764.42}{1+r_3}$$

$$P \quad 80863.763 = \frac{89764.42}{1+r3}$$

$$P \quad 1+r3 = 1.1100697$$

$$P \quad r3 = .1100697$$

Question 28

Given below is the Balance Sheet of S Ltd. as on 31.3.2008:

Liabilities	Rs. (in lakh)	Assets	Rs. (in lakh)
Share capital (share of Rs. 10)	100	Land and building	40
Reserves and surplus		Plant and machinery	80
Creditors	40	Investments	10
	30	Stock	20
		Debtors	15
		Cash at bank	5
	<u>170</u>		<u>170</u>

You are required to work out the value of the Company's, shares on the basis of Net Assets method and Profit-earning capacity (capitalization) method and arrive at the fair price of the shares, by considering the following information:

- Profit for the current year Rs. 64 lakhs includes Rs. 4 lakhs extraordinary income and Rs. 1 lakh income from investments of surplus funds; such surplus funds are unlikely to recur.
- In subsequent years, additional advertisement expenses of Rs. 5 lakhs are expected to be incurred each year.
- Market value of Land and Building and Plant and Machinery have been ascertained at Rs. 96 lakhs and Rs. 100 lakhs respectively. This will entail additional depreciation of Rs. 6 lakhs each year.
- Effective Income-tax rate is 30%.
- The capitalization rate applicable to similar businesses is 15%.

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Answer

Rs. lakhs

Net Assets Method

Assets: Land & Buildings	96
Plant & Machinery	100
Investments	10
Stocks	20
Debtors	15
Cash & Bank	<u>5</u>
Total Assets	246
Less: Creditors	<u>30</u>
Net Assets	<u>216</u>

Value per share

(a) Number of shares $\frac{1,00,00,000}{10} = 10,00,000$

(b) Net Assets Rs.2,16,00,000

$$\frac{\text{Rs.2,16,00,000}}{10,00,000} = \text{Rs.21.6}$$

Profit-earning Capacity Method

Profit before tax		64.00
Less: Extraordinary income	4.00	
Investment income (not likely to recur)	<u>1.00</u>	<u>5.00</u>
		59.00
Less: Additional expenses in forthcoming years		
Advertisement	5.00	
Depreciation	<u>6.00</u>	<u>11.00</u>
Expected earnings before taxes		48.00
Less: Income-tax @ 30%		<u>14.40</u>
Future maintainable profits (after taxes)		<u>33.60</u>

Value of business	224
Capitalisation factor	$\frac{33.60}{0.15} =$
Less: External Liabilities (creditors)	<u>30</u>
	<u>194</u>
Value per share	
$= \frac{1,94,00,000}{10,00,000} = \text{Rs.}19.4$	
Fair Price of share	Rs.
Value as per Net Assets Method	21.6
Value as per Profit earning capacity (Capitalisation) method	19.4
Fair Price = $\frac{21.6 + 19.4}{2} = \frac{41}{2} = \text{Rs.}20.5$	

Question 29

Calculate the price of 3 months PQR futures, if PQR (FV Rs.10) quotes Rs.220 on NSE and the three months future price quotes at Rs.230 and the one month borrowing rate is given as 15 percent and the expected annual dividend yield is 25 percent per annum payable before expiry. Also examine arbitrage opportunities.

Answer

Future's Price = Spot + cost of carry – Dividend

$$F = 220 + 220 \times 0.15 \times 0.25 - 0.025^{**} \times 10$$

$$= 225.75$$

** Entire 25% dividend is payable before expiry, which is Rs.2.50.

Thus we see that futures price by calculation is Rs.225.75 which is quoted at Rs.230 in the exchange.

Analysis:

Fair value of Futures less than Actual futures Price:

Futures Overvalued Hence it is advised to sell. Also do Arbitraging by buying stock in the cash market.

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Step I

He will buy PQR Stock at Rs.220 by borrowing at 15% for 3 months. Therefore his outflows are:

Cost of Stock	220
Add: Interest @ 15 % for 3 months i.e. 0.25 years ($220 \times 0.15 \times 0.025$)	8.25
Total Outflows (A)	228.25

Step II

He will sell March 2000 futures at Rs.230. Meanwhile he would receive dividend for his stock.

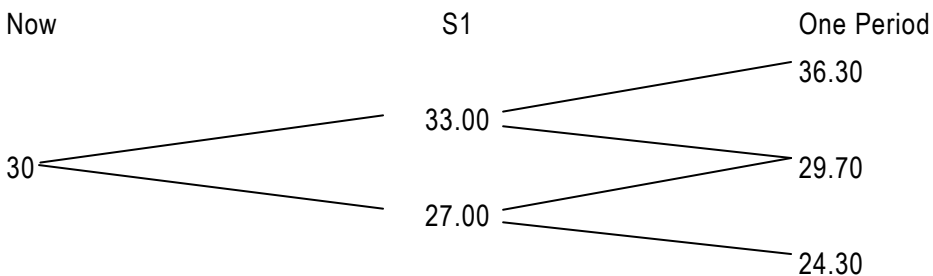
Hence his inflows are	230
Sale proceeds of March 2000 futures	2.50
Total inflows (B)	232.5

$$\begin{aligned}
 \text{Inflow} - \text{Outflow} &= \text{Profit earned by Arbitrageur} \\
 &= 232.5 - 228.25 \\
 &= 4.25
 \end{aligned}$$

EXERCISES

Question 1

Following is a two-period tree for a share of stock in CAB Ltd.:



Using the Binomial model, calculate the current fair value of a regular call option on CAB Stock with the following characteristics: $X = \text{Rs. } 28$, Risk Free Rate = 5 percent (per sub period). You should also indicate the composition of the implied riskless hedge portfolio at the valuation date.

(Answer: Rs. 3.83)

Question 2

You are trying to value a long term call option on the Standard and Poor's 500, expiring in 2 months, with a strike price of \$900. The index is currently at \$930, and the annualized standard deviation in stock prices is 20% per annum. The average dividend yield on the index is 0.3% per month, and is expected to remain unchanged over the next month. The Treasury bond rate is 8%.

- (a) Estimate the value of the long term call option.
- (b) Estimate the value of a put option, with the same parameters.

(Answer: (a) \$51.87 (b) \$14.37)

Question 3

Mr. X established the following spread on the Delta Corporation's stock :

- (i) Purchased one 3-month call option with a premium of Rs.30 and an exercise price of Rs.550.
- (ii) Purchased one 3-month put option with a premium of Rs.5 and an exercise price of Rs.450.

Delta Corporation's stock is currently selling at Rs.500. Determine profit or loss, if the price of Delta Corporation's:

- (a) Remains at Rs.500 after 3 months.
- (b) Falls at Rs.350 after 3 months.
- (c) Rises to Rs.600.

Assume the size option is 100 shares of Delta Corporation.

(Answer: (a) Net loss = Rs.3,500 (b) Net gain = Rs.6,500 (c) Net Gain = Rs.1,500)

Question 4

From the following data for certain stock, find the value of a call option:

Price of stock now	=	Rs.80
Exercise price	=	Rs.75
Standard deviation of continuously compounded annual return	=	0.40
Maturity period	=	6 months
Annual interest rate	=	12%

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Given

Number of S.D. from Mean, (z)	Area of the left or right (one tail)
0.25	0.4013
0.30	0.3821
0.55	0.2912
0.60	0.2578

$$e^{0.12 \times 0.05} = 1.0060$$

$$\ln 1.0667 = 0.0645$$

(Answer: Rs.11.52)

Question 5

The following information about copper scrap is given:

- Spot price : \$10,000 per ton
- Futures price : \$10,800 for a one year contract
- Interest rate : 12 %
- PV (storage costs) : \$500 per year

What is the PV (convenience yield) of copper scrap?

(Answer: \$857.14 per ton)

Hint:
$$\frac{\text{Futures price}}{(1 + \text{Risk-free rate})^1} = \text{Spot price} + \text{Present value of storage cost} - \text{Present value of convenience yield}$$

SECURITY ANALYSIS

BASIC CONCEPTS AND FORMULAE

1. Introduction

Security Analysis stands for the proposition that a well-disciplined investor can determine a rough value for a company from all of its financial statements, make purchases when the market inevitably under-prices some of them, earn a satisfactory return, and never be in real danger of permanent loss.

2. Approaches of Security Analysis

There are basically two main approaches of security analysis- Fundamental analysis and Technical analysis.

3. Fundamental Analysis

Fundamental analysis is based on the assumption that the share prices depend upon the future dividends expected by the shareholders. The present value of the future dividends can be calculated by discounting the cash flows at an appropriate discount rate and is known as the '*intrinsic value of the share*'. The intrinsic value of a share, according to a fundamental analyst, depicts the true value of a share. A share that is priced below the intrinsic value must be bought, while a share quoted above the intrinsic value must be sold.

4. Models of Fundamental Analysis

(a) Dividend Growth Model

$$P(0) = \frac{D(0)(1+g)}{(k - g)}$$

Where,

$P(0)$ = Price of Share

$D(0)$ = Current Dividend

g = Growth Rate

k = Cost of Equity

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(b) Dividend Growth Model and the PE Multiple

$$P(0) = \frac{bE(0)(1+g)}{(k-g)}$$

Where,

b = Dividend Pay-out fraction or ratio

E(0) = Current EPS

5. Types of Fundamental Analysis

There are three types of fundamental analysis-Economic analysis, Industry analysis and Company analysis.

6. Economic Analysis

Macro- economic factors e. g. historical performance of the economy in the past/ present and expectations in future, growth of different sectors of the economy in future with signs of stagnation/degradation at present to be assessed while analyzing the overall economy. Trends in peoples' income and expenditure reflect the growth of a particular industry/company in future. Consumption affects corporate profits, dividends and share prices in the market.

7. Factors Affecting Economic Analysis

Some of the economy wide factors are as under:

- (a) Growth Rates of National Income and Related Measures
- (b) Growth Rates of Industrial Sector
- (c) Inflation
- (d) Monsoon

8. Techniques Used For Economic Analysis

- (i) Anticipatory Surveys: They help investors to form an opinion about the future state of the economy.
- (ii) Barometer/Indicator Approach: Various indicators are used to find out how the economy shall perform in the future.
- (iii) Economic Model Building Approach: In this approach, a precise and clear relationship between dependent and independent variables is determined.

9. Industry Analysis

An assessment regarding all the conditions and factors relating to demand of the particular product, cost structure of the industry and other economic and

government constraints have to be done.

10. Factors Affecting Industry Analysis

The following factors may particularly be kept in mind while assessing the factors relating to an industry :

- (a) Product Life-Cycle;
- (b) Demand Supply Gap;
- (c) Barriers to Entry;
- (d) Government Attitude;
- (e) State of Competition in the Industry;
- (f) Cost Conditions and Profitability and
- (g) Technology and Research.

11. Techniques Used For Industry Analysis

- (a) *Regression Analysis*: Investor diagnoses the factors determining the demand for output of the industry through product demand analysis.
- (b) *Input – Output Analysis*: It reflects the flow of goods and services through the economy, intermediate steps in production process as goods proceed from raw material stage through final consumption.

12. Company Analysis

Economic and industry framework provides the investor with proper background against which shares of a particular company are purchased. This requires careful examination of the company's quantitative and qualitative fundamentals.

13. Techniques Used in Company Analysis

- (a) *Correlation & Regression Analysis*: Simple regression is used when inter relationship covers two variables. For more than two variables, multiple regression analysis is followed.
- (b) *Trend Analysis*: The relationship of one variable is tested over time using regression analysis. It gives an insight to the historical behavior of the variable.
- (c) *Decision Tree Analysis*: In decision tree analysis, the decision is taken sequentially with probabilities attached to each sequence. To obtain the probability of final outcome, various sequential decisions are given along with probabilities, then probabilities of each sequence is to be multiplied and then summed up.

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14. Technical Analysis

Technical analysis is a method of share price movements based on a study of price graphs or charts on the assumption that share price trends are repetitive, that since investor psychology follows a certain pattern, what is seen to have happened before is likely to be repeated.

15. Types of Charts

- (i) **Bar Chart** : In a bar chart, a vertical line (bar) represents the lowest to the highest price, with a short horizontal line protruding from the bar representing the closing price for the period.
- (ii) **Line Chart**: In a line chart, lines are used to connect successive day's prices. The closing price for each period is plotted as a point. These points are joined by a line to form the chart. The period may be a day, a week or a month.
- (iii) **Point and Figure Chart**: Point and Figure charts are more complex than line or bar charts. They are used to detect reversals in a trend.

16. General Principles and Methods of Technical Analysis

Certain principles underlying the technical analysis need to be understood and correlated with the tools and techniques of technical analysis. Interpreting any one method in isolation would not result in depicting the correct picture of the market.

17. The Dow Theory

The Dow Theory is based upon the movements of two indices, constructed by Charles Dow, Dow Jones Industrial Average (DJIA) and Dow Jones Transportation Average (DJTA). These averages reflect the aggregate impact of all kinds of information on the market. The movements of the market are divided into three classifications, all going at the same time; the primary movement, the secondary movement, and the daily fluctuations. The primary movement is the main trend of the market, which lasts from one year to 36 months or longer. This trend is commonly called bear or bull market. The secondary movement of the market is shorter in duration than the primary movement, and is opposite in direction. It lasts from two weeks to a month or more. The daily fluctuations are the narrow movements from day-to-day.

18. Market Indicators

- (i) **Breadth Index**: It is an index that covers all securities traded. It is computed by dividing the net advances or declines in the market by the number of issues traded. The breadth index either supports or contradicts the

movement of the Dow Jones Averages. If it supports the movement of the Dow Jones Averages, this is considered sign of technical strength and if it does not support the averages, it is a sign of technical weakness i.e. a sign that the market will move in a direction opposite to the Dow Jones Averages.

- (ii) *Volume of Transactions*: The volume of shares traded in the market provides useful clues on how the market would behave in the near future. A rising index/price with increasing volume would signal buy behaviour because the situation reflects an unsatisfied demand in the market. Similarly, a falling market with increasing volume signals a bear market and the prices would be expected to fall further. A rising market with decreasing volume indicates a bull market while a falling market with dwindling volume indicates a bear market. Thus, the volume concept is best used with another market indicator, such as the Dow Theory.
- (iii) *Confidence Index*: It is supposed to reveal how willing the investors are to take a chance in the market. It is the ratio of high-grade bond yields to low-grade bond yields. It is used by market analysts as a method of trading or timing the purchase and sale of stock, and also, as a forecasting device to determine the turning points of the market. A rising confidence index is expected to precede a rising stock market, and a fall in the index is expected to precede a drop in stock prices. A fall in the confidence index represents the fact that low-grade bond yields are rising faster or falling more slowly than high grade yields. The confidence index is usually, but not always a leading indicator of the market. Therefore, it should be used in conjunction with other market indicators.
- (iv) *Relative Strength Analysis*: The relative strength concept suggests that the prices of some securities rise relatively faster in a bull market or decline more slowly in a bear market than other securities i.e. some securities exhibit relative strength. Investors will earn higher returns by investing in securities which have demonstrated relative strength in the past because the relative strength of a security tends to remain undiminished over time.

Relative strength can be measured in several ways. Calculating rates of return and classifying those securities with historically high average returns as securities with high relative strength is one of them. Even ratios like security relative to its industry and security relative to the entire market can also be used to detect relative strength in a security or an industry.

- (v) *Odd - Lot Theory*: This theory is a contrary - opinion theory. It assumes that the average person is usually wrong and that a wise course of action is to

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pursue strategies contrary to popular opinion. The odd-lot theory is used primarily to predict tops in bull markets, but also to predict reversals in individual securities.

19. Support and Resistance Levels

When the index/price goes down from a peak, the peak becomes the resistance level. When the index/price rebounds after reaching a trough subsequently, the lowest value reached becomes the support level. The price is then expected to move between these two levels. Whenever the price approaches the resistance level, there is a selling pressure because all investors who failed to sell at the high would be keen to liquidate, while whenever the price approaches the support level, there is a buying pressure as all those investors who failed to buy at the lowest price would like to purchase the share. A breach of these levels indicates a distinct departure from status quo, and an attempt to set newer levels.

20. Interpreting Price Patterns

- (a) *Channel*: A series of uniformly changing tops and bottoms gives rise to a channel formation. A downward sloping channel would indicate declining prices and an upward sloping channel would imply rising prices.
- (b) *Wedge*: A wedge is formed when the tops (resistance levels) and bottoms (support levels) change in opposite direction (that is, if the tops are decreasing then the bottoms are increasing and vice versa), or when they are changing in the same direction at different rates over time.
- (c) *Head and Shoulders*: It is a distorted drawing of a human form, with a large lump (for head) in the middle of two smaller humps (for shoulders). This is perhaps the single most important pattern to indicate a reversal of price trend. The neckline of the pattern is formed by joining points where the head and the shoulders meet. The price movement after the formation of the second shoulder is crucial. If the price goes below the neckline, then a drop in price is indicated, with the drop expected to be equal to the distance between the top of the head and the neckline.
- (d) *Triangle or Coil Formation*: This formation represents a pattern of uncertainty and is difficult to predict which way the price will break out.
- (e) *Flags and Pennants Form*: This form signifies a phase after which the previous price trend is likely to continue.
- (f) *Double Top Form*: This form represents a bearish development, signals that price is expected to fall.

- (g) *Double Bottom Form*: This form represents bullish development signaling price is expected to rise.
- (h) *Gap*: A gap is the difference between the opening price on a trading day and the closing price of the previous trading day. Wider the gap, stronger is the signal for a continuation of the observed trend. On a rising market, if the opening price is considerably higher than the previous closing price, it indicates that investors are willing to pay a much higher price to acquire the scrip. Similarly, a gap in a falling market is an indicator of extreme selling pressure.

21. Decision Using Moving Averages

Moving averages are frequently plotted with prices to make buy and sell decisions. The two types of moving averages used by chartists are the Arithmetic Moving Average (AMA) and the Exponential Moving Average (EMA).

Buy and Sell Signals Provided by Moving Average Analysis

Buy Signal	Sell Signal
(a) Stock price line rise through the moving average line when graph of the moving average line is flattering out.	(a) Stock price line falls through moving average line when graph of the moving average line is flattering out.
(b) Stock price line falls below moving average line which is rising.	(b) Stock price line rises above moving average line which is falling.
(c) Stock price line which is above moving average line falls but begins to rise again before reaching the moving average line	(c) Stock price line which is slow moving average line rises but begins to fall again before reaching the moving average line.

22. Bollinger Bands

A band is plotted two standard deviations away from a simple moving average. Because standard deviation is a measure of volatility, Bollinger bands adjust themselves to the market conditions. When the markets become more volatile, the bands widen (move further away from the average), and during less volatile periods, the bands contract (move closer to the average). The tightening of the bands is often used by technical traders as an early indication that the volatility is about to increase sharply.

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23. Momentum Analysis

Momentum measures the speed of price change and provides a leading indicator of changes in trend. The momentum line leads price action frequently enough to signal a potential trend reversal in the market.

24. Bond Valuation

A bond or debenture is an instrument of debt issued by a business or government.

- (a) **Par Value:** Value stated on the face of the bond. It is the amount a firm borrows and promises to repay at the time of maturity.
- (b) **Coupon Rate and Interest:** A bond carries a specific interest rate known as the coupon rate. The interest payable to the bond holder is par value of the bond $\times$ coupon rate.
- (c) **Maturity Period:** Corporate bonds have a maturity period of 3 to 10 years. While government bonds have maturity periods extending up to 20-25 years. At the time of maturity the par (face) value plus nominal premium is payable to the bondholder.

25. Bond Valuation Model

Value of a bond is:

$$V = \sum_{t=1}^n \frac{I}{(1+k_d)^t} + \frac{F}{(1+k_d)^n}$$

$$V = I (PVIFA_{k_d, n}) + F (PVIF_{k_d, n})$$

Where,

V = Value of the bond

I = Annual interest payable on the bond

F = Principal amount (par value) of the bond repayable at the time of maturity

n = Maturity period of the bond.

Value of a bond with semi-annual interest is:

$$V = \sum_{t=1}^{2n} \left[\frac{I/2}{(1+k_d/2)^t} \right] + \left[\frac{F}{(1+k_d/2)^{2n}} \right]$$

$$= I/2 (PVIFA_{k_d/2, 2n}) + F (PVIF_{k_d/2, 2n})$$

Where,

V = Value of the bond

I/2 = Semi-annual interest payment

$K_d/2$ = Discount rate applicable to a half-year period

F = Par value of the bond repayable at maturity

$2n$ = Maturity period expressed in terms of half-yearly periods.

26. Price Yield Relationship

As the required yield increases, the present value of the cash flow decreases; hence the price decreases. Conversely, when the required yield decreases, the present value of the cash flow increases, hence the price increases.

27. Relationship between Bond Price and Time

Since the price of a bond must be equal to its par value at maturity (assuming that there is no risk of default), bond price changes with time.

28. Yield Curve

It shows how yield to maturity is related to term to maturity for bonds that are similar in all respects, except maturity.

$$\text{Discount at the yield to maturity : } (R_t) \text{ PV [CF(t)]} = \frac{CF(t)}{(1+R_t)^t}$$

Discount by the product of a spot rate plus the forward rates :

$$\text{PV [CF(t)]} = \frac{CF(t)}{(1 + r_1) (1 + r_2) \dots (1 + r_t)}$$

Question 1

A company is evaluating a new venture that will cost Rs. 10 crores. The venture will have a return on investment of 20 per cent and the firm forecasts a 12 per cent growth in earnings from the project. The treasurer has identified the following sources for financing the project:

- (a) *Equity shares to be sold at Rs. 400 per share.*
- (b) *Convertible debentures with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000), and convertible at Rs. 500 per share after 2010.*
- (c) *Debentures with warrants with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000), and with each bond having one warrant entitling the holder to buy one equity share at Rs. 500 after 2010.*

The financing decision is being made in the fourth quarter of 2008. Over the past ten years, a company has been growing at a 10 per cent rate of sales and earnings.

Year	Historical Market price	Year	Forecasted Probability	Market Price
	Rs.			Rs.
2003	220	2009	20%	450
2004	250		60%	500
2005	330		20%	600
2006	270	2010	20%	480
2007	380		60%	550
Current	450		20%	620
		2011	20%	500
			60%	600
			20%	700

A Company Ltd. Proforma Balance Sheet (December 31, 2008)

				(Rs.'000)	
	2008	2007		2008	2007
Equity Shares (Rs. 10)	10,000	10,000	Plant and Equipment	2,52,000	2,31,000
Share Premium	40,000	40,000	(Less: Accumulated		
Retained Earnings	1,36,000	1,27,000	Depreciation	<u>(62,000)</u>	<u>(59,000)</u>
Bonds (7%)	90,000	52,000		1,90,000	1,72,000
Mortgage (6%)	30,000	55,000	Inventories	64,000	62,000
Accounts Payable	7,000	6,000	Receivables	44,000	45,000
Other Current	11,000	10,000	Cash and Bank	22,000	18,000
Liabilities			Balances		
			Other Current Assets	<u>4,000</u>	<u>3,000</u>
	<u>3,24,000</u>	<u>3,00,000</u>		<u>3,24,000</u>	<u>3,00,000</u>

Proforma Income Statement (Rs.'000)

	Sales	EBIT	Interest*	EBT	NIAT	EPS
2008	4,20,000	71,500	8,000	63,500	31,750	31.75
2007	3,80,000	65,000	7,000	58,000	29,000	29.00

**Rounded off.*

The management of A Ltd. was initially impressed by the fact that the new venture will increase sales by Rs. 12 crores. Management is also interested in the expected 12 per cent growth rate of the venture. As per Company's Financial Policy, the firm's debt-asset ratio should not be above 40 per cent.

With the above information and detailed analysis for next 3 years, what will be the long-term sources of financing for the new proposal?

Make suitable assumptions in your answer, wherever necessary figures could be rounded off. Income-tax rate applicable to the company is to be taken at 50%.

Answer

The various steps for detailed analysis of given information for next 3 years for determining the long term sources of financing for the new proposal costing Rs. 10 crore are as follows:

Step 1: Determining the Size of Offering for Various Sources of Financing

- (i) Equity shares to be sold at Rs. 400 per share

Cost of new venture = Rs. 10 crore

No. of equity shares to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 400}}$

= 2,50,000 shares

- (ii) Convertible debentures with a 6% coupon to net Rs. 980 (face value Rs. 1,000), and convertible at Rs. 500 per share after 2010..

No. of debentures to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 980}} = 1,02,000$ (rounded off)

- (iii) Debentures with warrants with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000) and with each bond having one warrant entitling the holder to buy one equity share at Rs. 500 after 2010.

No. of debentures to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 980}} = 1,02,000$ (rounded off)

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Step 2: Computation of Earnings before Interest and Tax (EBIT) for next year

$$\begin{aligned}
 \text{EBIT (without new venture)} &= \text{Current EBIT} \times \text{Growth factor} \\
 &= \text{Rs. 7.15 crores} \times 1.10 \\
 &= \text{Rs. 7.865 crores} \\
 \text{EBIT (with new venture)} &= \text{Current EBIT} \times \text{Growth factor} + \text{Investment in} \\
 &\quad \text{New venture} \times \text{R.O.I of new venture} \\
 &= \text{Rs. 7.15 crores} \times 1.10 + \text{Rs. 10 crores} \times 20\% \\
 &= \text{Rs. 7.865 crores} + \text{Rs. 2 crores} \\
 &= \text{Rs. 9.865 crores}
 \end{aligned}$$

Step 3: Computation of Earnings before interest and tax (EBIT) after 3 years (at the end of planning horizon)

$$\begin{aligned}
 \text{EBIT (without new venture)} &= \text{Current EBIT} \times (\text{Growth factor})^3 \\
 &= \text{Rs. 7.15 crores} \times (1.10)^3 \\
 &= \text{Rs. 9.517 crores} \\
 \text{EBIT (with new venture)} &= \text{Current EBIT} \times (\text{Growth factor})^3 + \text{Investment in} \\
 &\quad \text{new venture} \times (\text{R.O.I of new venture})^2 \\
 &= \text{Rs. 7.15 crores} \times (1.10)^3 + \text{Rs. 10 crores} \times \\
 &\quad (20\%) \times (1.12)^2 \\
 &= \text{Rs. 9.5166 crores} + \text{Rs. 2.5088 crores} \\
 &= \text{Rs. 12.0254 crores}
 \end{aligned}$$

Step 4: To determine likelihood of issue of equity shares by conversion of debentures into equity or by exercise of warrants after year 2010

Expected price of equity shares during 3 year planning period.

Year	2009	2010	2011
	Rs.	Rs.	Rs.
	Rs. 450 $\times$ 20% = 90	Rs. 480 $\times$ 20% = 96	Rs. 500 $\times$ 20% = 100
	Rs. 500 $\times$ 60% = 300	Rs. 550 $\times$ 60% = 330	Rs. 600 $\times$ 60% = 360
	Rs. 600 $\times$ 20% = <u>120</u>	Rs. 620 $\times$ 20% = <u>124</u>	Rs. 700 $\times$ 20% = <u>140</u>
Expected price	<u>510</u>	<u>550</u>	<u>600</u>

Since the expected price of equity shares is more than the conversion and option price of Rs. 500 per share, it is likely that some equity will be created by 2011 as a result of conversion or exercise of warrants, if one of these financing methods is used.

Step 5: Calculation of the Effect on EBIT due to Exercise of Warrants

In forecasting future earnings per share, the firm must consider a likely profit on the additional capital provided by the exercise of warrants.

EBIT (if warrants are exercised) = Rs. 5.10 crores $\times$ 12.54%

= 0.63954 crores

(Refer to working notes 1 & 2)

Step 6: Statement showing computation of Earnings per share for next years' for various alternatives

(Rs. in crores)

	Alternatives			
	No new venture	Equity share	Convertible debt	Warrant debt
Earning before interest and tax	7.865	9.865	9.865	9.865
Less: Interest old debt	0.810	0.810	0.810	0.810
(Refer to working note 3)				
New debt	-	-	<u>0.612</u>	<u>0.612</u>
(Refer to working note 4)				
Earning before tax (EBT)	7.055	9.055	8.443	8.443
Less: Tax @ 50%	3.5275	4.5275	4.2215	4.2215
Earning after tax (EAT)	3.5275	4.5275	4.2215	4.2215
No. of shares (lakhs)	10	12.5	10	10
Earning per share (Rs.)	35.27	36.22	42.215	42.215

Step 7: Statement showing Computation of Earnings per share at the end of planning horizon for various alternatives

	Alternatives			
	No new venture	Equity share	Convertible debt	Warrant debt
Earnings before interest and tax (EBIT)	9.516	12.0254	12.0254	12.0254

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Add: Earnings before interest & tax

by Exercise of warrants - - - 0.63954

(Refer to step 5)

Less: Interest old debt	0.810	0.810	0.810	0.810
New debt	<u> </u>	<u> </u>	<u> </u>	<u>0.612</u>
Earning before tax (EBT)	8.706	11.2154	11.2154	11.2429
Less: Tax @ 50%	4.353	5.6077	5.6077	5.6214
Earning after tax (EAT)	4.353	5.6077	5.6077	5.6214
No. of shares (lakhs)	10	12.50	12.04	11.2

(Refer to working note 1) (Refer to working note 2)

Earning per share (EPS) (Rs.) 43.53 44.86 46.57 51.00

Step 8: Computation of Increase in Retained Earnings for Various Alternatives can be determined as follows:

$$\frac{1\text{st year earnings after tax} + 3\text{ years Earnings after tax (1 - Dividend payout)}}{2} \text{ No. of years}$$

$$\text{No new venture} = \frac{\text{Rs. 3.52 crores} + \text{Rs. 4.353 crores}}{2} \times 60\% \times 3 \text{ years}$$

$$= \text{Rs. 7.085 crores}$$

$$\text{Issue of equity shares} = \frac{\text{Rs. 4.527 crores} + \text{Rs. 5.608 crores}}{2} \times 60\% \times 3 \text{ years}$$

$$= \text{Rs. 9.121 crores}$$

$$\text{Issue of convertible debetures} = \frac{\text{Rs. 4.2215 crores} + \text{Rs. 5.608 crores}}{2} \times 60\% \times 3 \text{ years}$$

$$= \text{Rs. 8.846 crores}$$

$$\text{Issue of warrant debt} = \frac{\text{Rs. 4.2215 crores} + \text{Rs. 5.621 crores}}{2} \times 60\% \times 3 \text{ years}$$

$$= \text{Rs. 8.858 crores}$$

Step 9: Analysis for Measuring the Degree of Risk in Capital Structure

	(Rs. in crores)			
	No new venture	Equity share	Convertible debt	Warrant debt
<i>End of the year 2008</i>				
Old debt	12.0	12.0	12.0	12.0
New debt	—	—	<u>10.2</u>	<u>10.2</u>
	<u>12.0</u>	<u>12.0</u>	<u>22.2</u>	<u>22.2</u>
Old equity	18.6	18.6	18.6	18.6
New equity	—	<u>10.0</u>	—	—
	<u>18.6</u>	<u>28.6</u>	<u>18.6</u>	<u>18.6</u>
Debt asset ratio	39.2%	29.6%	54.5%	54.5%
<i>End of the year 2011</i>				
Old debt	12.0	12.0	12.0	12.0
New debt	—	—	—	<u>10.2</u>
	<u>12.0</u>	<u>12.0</u>	<u>12.0</u>	<u>22.2</u>
Old equity	18.6	18.6	18.6	18.6
New equity	-	10.0	10.2	5.10
Increase in retained earnings	<u>7.0865</u>	<u>9.121</u>	<u>8.846</u>	<u>8.858</u>
	<u>25.6865</u>	<u>37.721</u>	<u>37.646</u>	<u>32.558%</u>
Debt asset ratio	31.8%	24.1%	24.1%	40.5%

Working Notes:

- Equity shares from conversion of debentures:
 Debentures issued ´ Shares per debenture (on conversion)
 = 1,02,000 debentures ´ 2 share per debenture
 = 2,04,000 shares
 Equity shares from exercise of warrants
 Bonds issued ´ Shares per bond (Exercise of warrants)
 = 1,02,000 bonds ´ 1 share per bond

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= 1,02,000 shares

Value of shares = 1,02,000 shares × Rs. 500 (option price)

= Rs. 5.10 crores

2. Return on new equity shares (on exercise of warrants)

The return on additional capital provided by the exercise of warrants to issue equity shares is the lower figure between average return for the firm and the return on the new proposal if adopted.

Average return on market value of firm

$$= \frac{\text{EBIT}}{\text{Debt} + \text{Market value of equity shares}}$$

$$= \frac{\text{Rs. 7.15 crores}}{(\text{Rs. 9 crores} + \text{Rs. 3 crores}) + (10 \text{ lakhs shares} \times \text{Rs. 450})}$$

$$= \frac{\text{Rs. 7.15 crores}}{\text{Rs. 12 crores} + \text{Rs. 45 crores}}$$

$$= \frac{\text{Rs. 7.15 crores}}{\text{Rs. 57 crores}}$$

= 12.54%

R.O.I from new proposal = 20%

Since the average return on market value of firm is lower than R.O.I. from new proposal (20%). Hence, return on new equity shares on exercise of warrants is 12.54%.

3. Interest on old debt

(Rs. in crores)

7% Bonds of Rs. 9 crores 0.630

6% Mortgage of Rs. 3 crores 0.810

0.810

4. Interest on new debt

6% debentures of Rs. 10.2 crores = Rs. 0.612 crores

Conclusions:

1. Issue of equity shares for financing the project offers high earnings and is within the company's Financial Policy.

2. Issue of convertible debentures for financing the project offers high earnings but the firm's debt asset ratio exceeds 40% now and there is a possibility of it being within the company's Financial Policy by year 2011.
3. Issue of warrants for financing the project offers high earnings but is beyond the company Financial Policy (Debt asset ratio exceeds 40%) both now and in the year 2011.

In conclusion, the firm should consider financing the project to gain the large rise in earnings. The equity shares only or a mixture of equity shares and debt financing, represents the most attractive financing alternative. With mixed financing, the firm can achieve a significant rise in earnings without increasing the risk of exceeding the 40 per cent debt – asset guidelines.

Assumptions:

1. It is assumed that the earnings from new project occur at the end of the year.
2. It is assumed that the debentures will be converted into shares in the year 2011.
3. It is assumed that all the holders of the warrants will buy equity shares in the year 2011.

Question 2

The HLL has Rs. 8.00 crore of 10% mortgage bonds outstanding under an open-end scheme. The scheme allows additional bonds to be issued as long as all of the following conditions are met:

- (1) *Pre - tax interest coverage $\frac{\text{Income before tax} + \text{Bond Interest}}{\text{Bond Interest}}$ remains greater than 4.*
- (2) *Net depreciated value of mortgage assets remains twice the amount of the mortgage debt.*
- (3) *Debt-to-equity ratio remains below 5.*

The HLL has net income after taxes of Rs. 2 crores and a 40% tax-rate, Rs. 40 crores in equity and Rs. 30 crores in depreciated assets, covered by the mortgage.

Assuming that 50% of the proceeds of a new issue would be added to the base of mortgaged assets and that the company has no Sinking Fund payments until next year, how much more 10% debt could be sold under each of the three conditions? Which protective covenant is binding?

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Answer

Let x be the crores of Rupees of new 10% debt which would be sold under each of the three given conditions. Now, the value of x under each of the three conditions is as follows:

1. Pre-tax interest coverage $\frac{\text{EBIT} - \text{Bond Interest}}{\text{Bond Interest}}$ remains greater than 4.

$$\frac{\text{Rs. 2 crores} / (1 - 0.4) + 8 \text{ crores} \times 0.1 + x \times 0.1}{(8 \text{ crores} \times 0.1) + (x \times 0.1)}$$

$$\text{Or } \frac{\text{Rs. 3.33 crores} + 0.80 \text{ crores} + 0.10x}{(0.80 \text{ crores} + \text{Rs. } 0.10x)}$$

$$\text{Or } \frac{\text{Rs. 4.13 crores} + 0.10x}{\text{Rs. 0.80 crores} + \text{Rs. } 0.10x}$$

$$\text{Or } \text{Rs. 4.13 crores} + 0.10x = 4 (\text{Rs. 0.80 crores} + \text{Rs. } 0.10x)$$

$$\text{Or } \text{Rs. 4.13 crores} + 0.10x = \text{Rs. 3.2 crores} + \text{Rs. } 0.40x$$

$$\text{Or } \text{Rs. } 0.30x = 0.93$$

$$\text{Or } x = \text{Rs. } 0.93 / 0.30$$

$$\text{Or } x = \text{Rs. 3.10 crores}$$

Additional mortgage required shall be a maximum of Rs. 3.10 crores.

2. Net depreciated value of mortgage assets remains twice the amount of mortgage debt

(Assuming that 50% of the proceeds of new issue would be added to the base of mortgaged assets)

$$\text{i.e. } \frac{\text{Rs. 30 crores} + 0.5x}{\text{Rs. 8 crores} + x} = 2$$

$$\text{or } \text{Rs. 30 crores} + 0.5x = 2 (\text{Rs. 8 crores} + x)$$

$$\text{or } \text{Rs. } 1.5x = \text{Rs. 14 crores}$$

$$\text{or } x = \frac{\text{Rs. 14 crores}}{1.5}$$

$$\text{or } x = 9.33 \text{ crores}$$

Additional mortgage required to satisfy condition No. 2 is Rs. 9.33 crores

3. Debt to equity ratio remains below 5

$$\text{i.e. } \frac{\text{Rs. 8 crores} + x}{\text{Rs. 40 crores}} < 5$$

$$\text{or Rs. 8 crores} + x = \text{Rs. 200 crores}$$

$$\text{or } x = \text{Rs. 192 crores}$$

Since all the conditions are to be met, the least i.e. Rs. 3.10 crores (as per condition – 1) can be borrowed by issuing additional bonds.

Note: Since in the question, it is given that Debt to equity ratio remains below 5, the value of debt is computed by using this condition. However, the new additional debt (x) is exorbitant and is not comparable with the value of new additional debt (x) computed under conditions 1 and 2. For getting the comparable value of new additional debt x the debt to equity ratio should be read as 0.5. Accordingly, value of additional debt would be Rs. 12 crores.

Question 3

A company has a book value per share of Rs. 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the Opportunity Cost of Capital is 18%, what is the price of the share today?

Answer

The company earnings and dividend per share after a year are expected to be:

$$\text{EPS} = \text{Rs. } 137.8 \times 0.15 = \text{Rs. } 20.67$$

$$\text{Dividend} = 0.40 \times 20.67 = \text{Rs. } 8.27$$

The growth in dividend would be:

$$g = 0.6 \times 0.15 = 0.09$$

$$\text{Perpetual growth model Formula: } P_0 = \frac{\text{Dividend}}{K_e - g}$$

$$P_0 = \frac{8.27}{0.18 - 0.09}$$

$$P_0 = \text{Rs. } 91.89$$

Alternative Solution:

However, in case a student follows Walter's approach as against continuous growth model given in previous solution the answer of the question works out to be different. This can be shown as follow:

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Given data:

Book value per share	= Rs. 137.80
Return on equity	= 15%
Dividend Payout	= 40%
Cost of capital	= 18%
\ EPS	= Rs. 137.80 × 15%
	= Rs. 20.67
\ Dividend	= Rs. 20.67 × 40%
	= Rs. 8.27

Walter's approach showing relationship between dividend and share price can be expressed by the following formula

$$V_c = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where,

V_c = Market Price of the ordinary share of the company.

R_a = Return on internal retention i.e. the rate company earns on retained profits.

R_c = Capitalisation rate i.e. the rate expected by investors by way of return from particular category of shares.

E = Earnings per share.

D = Dividend per share.

Hence,

$$\begin{aligned}
 V_c &= \frac{8.27 + \frac{.15}{.18}(20.67 - 8.27)}{.18} \\
 &= \frac{18.60}{.18} \\
 &= \text{Rs. } 103.35
 \end{aligned}$$

Question 4

Pragya Limited has issued 75,000 equity shares of Rs. 10 each. The current market price per share is Rs. 24. The company has a plan to make a rights issue of one new equity

share at a price of Rs. 16 for every four share held.

You are required to:

- (i) Calculate the theoretical post-rights price per share;
- (ii) Calculate the theoretical value of the right alone;
- (iii) Show the effect of the rights issue on the wealth of a shareholder, who has 1,000 shares assuming he sells the entire rights; and
- (iv) Show the effect, if the same shareholder does not take any action and ignores the issue.

Answer

- (i) Calculation of theoretical Post-rights (ex-right) price per share:

$$\text{Ex-right value} = \frac{M \times N + S \times R}{N + R}$$

Where,

M = Market price,

N = Number of old shares for a right share

S = Subscription price

R = Right share offer

$$= \frac{₹(\text{Rs. } 24 \times 4) + (\text{Rs. } 16 \times 1)}{4 + 1}$$

$$= \text{Rs. } 22.40$$

- (ii) Calculation of theoretical value of the rights alone:

= Ex-right price – Cost of rights share

= Rs. 22.40 – Rs. 16 = Rs. 6.40

- (iii) Calculation of effect of the rights issue on the wealth of a shareholder who has 1,000 shares assuming he sells the entire rights:

Rs.

- (a) Value of shares before right issue

(1,000 shares × Rs. 24)

24,000

- (b) Value of shares after right issue

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(1,000 shares × Rs. 22.40)	22,400
Add: Sale proceeds of rights renunciation	
(250 shares × Rs. 6.40)	<u>1,600</u>
	<u>24,000</u>

There is no change in the wealth of the shareholder if he does not take any action and ignores the issue.

- (iv) Calculation of effect if the shareholder does not take any action and ignores the issue:

	Rs.
Value of shares before right issue	
(1,000 shares × Rs. 24)	24,000
Less: Value of shares after right issue	
(1,000 shares × Rs. 22.40)	<u>22,400</u>
Loss of wealth to shareholders, if rights ignored	<u>1,600</u>

Question 5

M/s Agfa Industries is planning to issue a debenture series on the following terms:

Face value	Rs. 100
Term of maturity	10 years
Yearly coupon rate	
Years	
1 - 4	9%
5 - 8	10%
9 - 10	14%

The current market rate on similar debentures is 15 per cent per annum. The Company proposes to price the issue in such a manner that it can yield 16 per cent compounded rate of return to the investors. The Company also proposes to redeem the debentures at 5 per cent premium on maturity. Determine the issue price of the debentures.

Answer

The issue price of the debentures will be the sum of present value of interest payments during 10 years of its maturity and present value of redemption value of debenture.

Years	Cash out flow (Rs.)	PVIF @ 16%	PV
1	9	.862	7.758
2	9	.743	6.687
3	9	.641	5.769
4	9	.552	4.968
5	10	.476	4.76
6	10	.410	4.10
7	10	.354	3.54
8	10	.305	3.05
9	14	.263	3.682
10	14 + 105 = 119	.227	<u>3.178 + 23.835</u>
			71.327

Thus the debentures should be priced at Rs. 71.327

Question 6

There is a 9% 5-year bond issue in the market. The issue price is Rs. 90 and the redemption price Rs. 105. For an investor with marginal income tax rate of 30% and capital gains tax rate of 10% (assuming no indexation), what is the post-tax yield to maturity?

Answer

Calculation of yield to Maturity (YTM)

$$YTM = \frac{\text{Coupon} + \text{Pro-rated disc.}}{(\text{Redemption price} + \text{Purchase Price})/2}$$

After tax coupon = $9 \times (1 - .30) = 6.3\%$

After tax redemption price = $105 - (15 \times .10)$ or Rs. 103.5

After tax capital gain = $103.5 - 90 = \text{Rs. } 13.5$

$$YTM = \frac{6.3 + (13.5/5)}{(103.5 + 90)/2} \text{ or } \frac{9.00}{96.75} = 9.30\%$$

Question 7

ABC Limited's shares are currently selling at Rs. 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise Rs. 20 lakhs to Finance a new project.

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Required:

What are the ex-right price of shares and the value of a right, if

- (i) *The firm offers one right share for every two shares held.*
- (ii) *The firm offers one right share for every four shares held.*
- (iii) *How does the shareholders' wealth change from (i) to (ii)? How does right issue increases shareholders' wealth?*

Answer

- (i) Number of shares to be issued : 5,00,000

$$\text{Per - right} = \frac{\text{Rs. } 1,30,00,000 + 20,00,000}{15,00,000} = \text{Rs. } 10$$

$$\text{Subscription price Rs. } 20,00,000 / 5,00,000 = \text{Rs. } 4$$

$$\text{Value of right} = \frac{\text{Rs. } 10 - 4}{2} = 3$$

- (ii) $\text{Per - right} = \frac{\text{Rs. } 1,30,00,000 + 20,00,000}{12,50,000} = \text{Rs. } 12$

$$\text{Subscription price Rs. } 20,00,000 / 2,50,000 = \text{Rs. } 8$$

$$\text{Value of right} = \frac{\text{Rs. } 12 - 8}{4} = \text{Rs. } 1$$

- (iii) Since right issue is constructed in such a way so that shareholders' proportionate share will remain unchanged, shareholders' wealth does not change from (i) to (ii).

Right issue increases shareholders' wealth because the cost of issuing right shares is much lower than the cost of a public issue.

Question 8

The following data are available for a bond

Face value	Rs. 1,000
Coupon Rate	16%
Years to Maturity	6
Redemption value	Rs. 1,000
Yield to maturity	17%

What is the current market price, duration and volatility of this bond? Calculate the expected market price, if increase in required yield is by 75 basis points.

Answer

1. Calculation of Market price:

$$YTM = \frac{\frac{\text{Coupon interest} + \frac{\text{Discount or premium}}{\text{Years left}}}{\frac{\text{Face Value} + \text{Market value}}{2}}}{2}$$

Discount or premium – YTM is more than coupon rate, market price is less than Face Value i.e. at discount.

Let x be the market price

$$0.17 = \frac{160 + \frac{(1,000 - x)}{6}}{\frac{1,000 + x}{2}}$$

$$x = \text{Rs. } 960.26$$

Alternatively, the candidate may attempt by

$$160 (\text{PVIFA } 17, 6) + 1,000 (\text{PVIFA } 17, 6)$$

$$= 160 (3.589) + 1,000 (.390)$$

$$= 574.24 + 390$$

$$= 964.24$$

2. Duration

Year	Cash flow	P.V. @ 17%		Proportion of bond value	Proportion of bond value x time (years)
1	160	.855	136.8	0.142	0.142
2	160	.731	116.96	0.122	0.244
3	160	.624	99.94	0.104	0.312
4	160	.534	85.44	0.089	0.356
5	160	.456	72.96	0.076	0.38
6	1160	.390	<u>452.4</u>	<u>0.467</u>	<u>2.802</u>
			<u>964.4</u>	<u>1.000</u>	<u>4.236</u>

Duration of the Bond is 4.236 years

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3. Volatility

$$\text{Volatility of the bonds} = \frac{\text{Duration}}{(1 + \text{yields})} = \frac{4.236}{1.17} \\ = 3.62$$

4. The expected market price if increase in required yield is by 75 basis points.

$$= \text{Rs. } 960.26 \times .75 (3.62/100)$$

$$= \text{Rs. } 26.071$$

$$\text{Hence expected market price is Rs. } 960.26 - \text{Rs. } 26.071 = \text{Rs. } 934.189$$

Hence, the market price will decrease

This portion can also be alternatively done as follows

$$= \text{Rs. } 964.4 \times .75 (3.62/100)$$

$$= \text{Rs. } 26.18$$

then the market price will be

$$= \text{Rs. } 964.4 - 26.18 = \text{Rs. } 938.22$$

Question 9

M/s Transindia Ltd. is contemplating calling Rs. 3 crores of 30 years, Rs. 1,000 bond issued 5 years ago with a coupon interest rate of 14 per cent. The bonds have a call price of Rs. 1,140 and had initially collected proceeds of Rs. 2.91 crores due to a discount of Rs. 30 per bond. The initial floating cost was Rs. 3,60,000. The Company intends to sell Rs. 3 crores of 12 per cent coupon rate, 25 years bonds to raise funds for retiring the old bonds. It proposes to sell the new bonds at their par value of Rs. 1,000. The estimated floatation cost is Rs. 4,00,000. The company is paying 40% tax and its after cost of debt is 8 per cent. As the new bonds must first be sold and their proceeds, then used to retire old bonds, the company expects a two months period of overlapping interest during which interest must be paid on both the old and new bonds. What is the feasibility of refunding bonds?

Answer

NPV for bond refunding

Rs.

PV of annual cash flow savings (W.N. 2)

$$(3,49,600 \times \text{PV/FA } 8,25) \text{ i.e. } 10.675$$

$$37,31,980$$

Less: Initial investment (W.N. 1)	<u>29,20,000</u>
NPV	8,11,980

Recommendation: Refunding of bonds is recommended as NPV is positive.

Working Notes:

(1) Initial investment:

(a) Call premium		
Before tax ($1,140 - 1,000$) $\times$ 30,000	42,00,000	
Less tax @ 40%	<u>16,80,000</u>	
After tax cost of call prem.		25,20,000
(b) Floatation cost	_____	4,00,000
(c) Overlapping interest		
Before tax ($.14 \times 2/12 \times 3$ crores)	7,00,000	
Less tax @ 40%	<u>2,80,000</u>	4,20,000
(d) Tax saving on unamortised discount on old bond $25/30 \times 9,00,000 \times .4$ (3,00,000)		
(e) Tax savings from unamortised floatation		
Cost of old bond $25/30 \times 3,60,000 \times .4$		<u>(1,20,000)</u>
		<u>29,20,000</u>

(2) Annual cash flow savings:

(a) Old bond		
(i) Interest cost ($.14 \times 3$ crores)	42,00,000	
Less tax @ 40%	<u>16,80,000</u>	25,20,000
(ii) Tax savings from amortisation of discount $9,00,000/30 \times .4$		(12,000)
(iii) Tax savings from amortisation of floatation cost $3,60,000/30 \times .4$		<u>(4,800)</u>
Annual after cost payment of Debt (A)		25,03,200

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(b) New bond

(i)	Interest cost before tax (.12 ´ 3 crores)	36,00,000	
	Less tax @ 40%	<u>14,40,000</u>	
	After tax interest	21,60,000	
(ii)	Tax savings from amortisation of floatation cost (.4 ´ 4,00,000/25)	<u>(6,400)</u>	<u>21,53,600</u>
	Annual after tax payment		<u>3,49,600</u>

Question 10

Find the current market price of a bond having face value Rs.1,00,000 redeemable after 6 year maturity with YTM at 16% payable annually and duration 4.3202 years. Given $1.16^6 = 2.4364$.

Answer

$$\text{Duration } 4.3202 = \frac{(1.16/0.16) - [1.16 + 6(c-0.16)]}{c[(1.16)^6 - 1] + 0.16}$$

$$4.3202 = \frac{1.16}{0.16} - \frac{1.16 + 6(c - 0.16)}{c[(1.16)^6 - 1] + 0.16}$$

$$\frac{1.16 + 6c - 0.96}{1.4364c + 0.16} = 2.9298$$

$$0.2 + 6c = 4.20836472c + 0.468768$$

$$1.79163528c = 0.268768$$

$$C = 0.150012679$$

$$\therefore c = 0.15$$

Where c = Coupon rate

$$\begin{aligned} \text{Therefore, current price} &= \text{Rs.}(1,00,000/- \times 0.15 \times 3.685 + 1,00,000/- \times 0.410) \\ &= \text{Rs.}96,275/- \end{aligned}$$

Question 11

MP Ltd. issued a new series of bonds on January 1, 2010. The bonds were sold at par (Rs.1,000), having a coupon rate 10% p.a. and mature on 31st December, 2025. Coupon payments are made semiannually on June 30th and December 31st each year. Assume that you purchased an outstanding MP Ltd. bond on 1st March, 2018 when the going interest rate was 12%.

Required:

- (i) What was the YTM of MP Ltd. bonds as on January 1, 2010?
- (ii) What amount you should pay to complete the transaction? Of that amount how much should be accrued interest and how much would represent bonds basic value.

Answer

- (i) Since the bonds were sold at par, the original YTM was 10%.

$$Y + M = \frac{\text{Interest}}{\text{Principal}} = \frac{\text{Rs.100}}{\text{Rs.1,000}} 10\%$$

- (ii) Price of the bond as on 1st July, 2025 = Rs.50 × 9.712 + 1,000 × 0.417
= Rs.902.60

$$\text{Total value of the bond on the next interest date} = \text{Rs.902.60} + \text{Rs.50}$$

$$= \text{Rs.952.60}$$

$$\begin{aligned} \text{Value of bond at purchase date} &= \text{Rs.952} \times \frac{1}{(1+0.6)^{2/3}} \\ &= \text{Rs.952.60} \times \text{Rs.0.731004} \\ &\quad (\text{by using excel}) \\ &= \text{Rs.696.35} \end{aligned}$$

The amount to be paid to complete the transaction is Rs.696.35. Out of this amount Rs.16.57 represent accrued interest and Rs.679.68 represent the bond basic value.

Alternative solution:

$$Bo = \sum_{t=1}^{2n} \frac{\frac{1}{2}(Int_t)}{(1+\frac{kd}{2})^t} + \frac{B_m}{(1+\frac{kd}{2})^{2n}}$$

$$Bo = \sum_{t=1}^{2 \times 15} \frac{\frac{1}{2}(100)}{(1+\frac{12}{2})^t} + \frac{1000}{(1+\frac{12}{2})^{2 \times 15}}$$

$$Bo = \sum_{t=1}^{30} \frac{50}{(1.06)^t} + \frac{1000}{(1.06)^{2 \times 15}}$$

$$\begin{aligned} Bo &= 50 \times 13.765 + 1000 \times .174 \\ &= 688.25 + 174 = 862.25 \end{aligned}$$

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Therefore Value of Bond at purchase date

$$= \text{Rs } 862.25 \times \text{Rs } 0.731004$$

$$= \text{Rs. } 630.31$$

The amount to be paid to complete the transaction is Rs.630.31. Out of this amount Rs.16.57 represent accrued interest and Rs.613.64 represent the bond basic value.

Question 12

On the basis of the following information:

$$\text{Current dividend (Do)} = \text{Rs. } 2.50$$

$$\text{Discount rate (k)} = 10.5\%$$

$$\text{Growth rate (g)} = 2\%$$

- (i) Calculate the present value of stock of ABC Ltd.
- (ii) Is its stock overvalued if stock price is Rs.35, ROE = 9% and EPS = Rs.2.25? Show detailed calculation.

Answer

- (i) Present Value of the stock of ABC Ltd. Is:-

$$V_0 = \frac{2.50(1.02)}{0.105 - 0.02}$$

$$= \text{Rs. } 30/-.$$

- (ii) Pay out ratio of ABC Ltd. = $\frac{2.5}{2.25}$

$$= 1.111$$

$$\text{Hence, Retention ratio} = 1 - 1.111$$

$$= -0.111$$

$$\text{Or } -11.1\%$$

$$\text{Sustainable growth ratio is} = -0.111 \times 0.09$$

$$= -0.00999$$

$$= -0.999\%$$

Using the constant growth model, the value is

$$\begin{aligned}
 &= \frac{\text{Rs.}2.50(0.99)}{0.105 - (-0.00999)} \\
 &= \frac{2.475}{0.11499} \\
 &= \text{Rs.}21.52
 \end{aligned}$$

This value is less than the stock price of Rs.30/- as calculated above or Rs.35, as given in the question, which indicates that stock of ABC Ltd. is Overvalued.

Alternative answer (ii)

$$\begin{aligned}
 (\text{MV}) \text{ of Stock in Rs.} &= \frac{D_1}{k_e - g} = \frac{D_0(1+g)}{(k_e - g)} \\
 &= \frac{2.5 \times 1.02}{0.105 - 0.02} = 30(\text{BV}) = \frac{\text{Rs.}225}{0.09} = \text{Rs.}25
 \end{aligned}$$

Again $\frac{(\text{MV})}{(\text{BV})} = \frac{k_r - g}{k_e - g}$ where symbols denote their usual notations.

$$\text{So, } \frac{0.09 - 0.02}{0.105 - 0.02} = \frac{(\text{MV})}{25} \text{ or, } \frac{0.07}{0.085} = \frac{(\text{MV})}{25}$$

$$\therefore (\text{MV}) = \frac{\text{Rs.}0.07}{0.085} \times 25 = \text{Rs.}20.59$$

Based on $\frac{(\text{MV})}{(\text{BV})}$ ratio and based on perpetual growth model the price of the share should be Rs.20.59 and Rs.30 respectively which are lower than the present (MV) of Rs.35.

The stock is therefore, Overvalued.

Question 13

ABC Ltd. has been maintaining a growth rate of 10 percent in dividends. The company has paid dividend @ Rs.3 per share. The rate of return on market portfolio is 12 percent and the risk free rate of return in the market has been observed as 8 percent. The Beta co-efficient of company's share is 1.5.

You are required to calculate the expected rate of return on company's shares as per CAPM model and equilibrium price per share by dividend growth model.

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Answer

CAPM formula for calculation of Expected Rate of Return is :

$$\begin{aligned}
 ER &= R_f + B (R_m - R_f) \\
 &= 8 + 1.5 (12 - 8) \\
 &= 8 + 1.5 (4) \\
 &= 8 + 6 \\
 &+ 14\% \text{ or } 0.14
 \end{aligned}$$

Applying Dividend Growth Model for the calculation of per share equilibrium price:

$$ER = \frac{D_1}{P_0} + g$$

$$0.14 = \frac{3(1.10)}{P_0} + 0.10$$

$$0.14 - 0.10 = \frac{3.30}{P_0}$$

$$0.04 P_0 = 3.30$$

$$P_0 = \frac{3.30}{0.04}$$

$$= \text{Rs.}82.50$$

Per share equilibrium price will be Rs.82.50.

Question 14

Based on the credit rating of bonds, Mr. Z has decided to apply the following discount rates for valuing bonds:

Credit Rating	Discount Rate
AAA	364 day T bill rate + 3% spread
AA	AAA + 2% spread
A	AAA + 3% spread

He is considering to invest in AA rated, Rs.1,000 face value bond currently selling at Rs.1,025.86. The bond has five years to maturity and the coupon rate on the bond is 15% p.a. payable annually. The next interest payment is due one year from today and the bond is redeemable at par. (Assume the 364 day T-bill rate to be 9%).

You are required to calculate the intrinsic value of the bond for Mr. Z. Should he invest in the bond? Also calculate the current yield and the Yield to Maturity (YTM) of the bond.

Answer

The appropriate discount rate for valuing the bond for Mr. Z is:

$$R = 9 + 3 + 2 = 14\%$$

Time	CF	PVIF 14%	PV (CF)	PV (CF)
1	150	0.877		131.55
2	150	0.769		115.35
3	150	0.675		101.25
4	150	0.592		88.80
5	1150	0.519		596.85
				∑ PV (CF) i.e.
				$P_0 = 1033.80$

Since, the current market value is less than the intrinsic value; Mr. Z should buy the bond.

$$\text{Current yield} = \text{Annual Interest} / \text{Price} = 150 / 1025.86 = 14.62\%$$

The YTM of the bond is calculated as follows:

@15%

$$P = 150 \times \text{PVIFA}_{15\%, 4} + 1150 \times \text{PVIF}_{15\%, 5}$$

$$= 150 \times 2.855 + 1150 \times 0.0497$$

$$= 428.25 + 571.55 = 999.80$$

@14%

As found in sub part (a) $P_0 = 1033.80$

By interpolation we get, YTM = 14.23%

Question 15

A money market instrument with face value of Rs.100 and discount yield of 6% will mature in 45 days. You are required to calculate:

- (i) Current price of the instrument.
- (ii) Bond equivalent yield
- (iii) Effective annual return.

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Answer

$$(i) \quad \text{Current price of the Bond} = 100 \times [1 - \{45/360\} \times 0.06] \\ = \text{Rs.}99.25$$

Alternatively, the current price of bond may also be calculated as follows:

$$\frac{D}{100 - D} \times \frac{360}{45} = 0.06$$

$$\frac{D}{100 - D} = 0.06 \times \frac{45}{360}$$

$$\frac{D}{100 - D} = 0.06 \times \frac{1}{8}$$

$$8D = 6 - 0.06D$$

$$8.06D = 6$$

$$D = \frac{6}{8.06} = 0.7444$$

Current price of the bond = Face value – D

$$= \text{Rs.}100 - 0.7444 = \text{Rs.}99.2556$$

$$(ii) \quad \text{Bond equivalent yield} = \frac{100 - 99.25}{99.25} \times \frac{360}{45} = 6.045\% \text{ P.A.}$$

$$(iii) \quad \text{Effective annual return} = [1 + (0.06045/8)^8] - 1 \\ = 6.045\% \text{ P.A..}$$

Note: If a year of 365 days is considered the Bond equivalent yield and Effective annual return works out to 6.129% P.A.

EXERCISES

Question 1

Phototech plc has in issue 9% bonds which are redeemable at their par value of £100 in five years' time. Alternatively, each bond may be converted on that date into 20 ordinary shares of the company. The current ordinary share price of Phototech plc is £4.45 and this is expected to grow at a rate of 6.5% per year for the foreseeable future. Phototech plc has a cost of debt of 7% per year. You are required to calculate the following current values for each £ 100 convertible bond:

$$(i) \quad \text{Market value;}$$

- (ii) Floor value; and
- (iii) Conversion premium.

(Answer: (i) £ 123·89 (ii) £ 108·20 (iii) £34·89)

Question 2

On 1 June 2003 the financial manager of Gadgets Corporation's Pension Fund Trust is reviewing strategy regarding the fund. Over 60% of the fund is invested in fixed rate long-term bonds. Interest rates are expected to be quite volatile for the next few years.

Among the pension fund's current investments are two AAA rated bonds:

- 1) Zero coupon June 2018
- 2) 12% Gilt June 2018 (interest is payable semi-annually)

The current annual redemption yield (yield to maturity) on both bonds is 6%. The semi-annual yield may be assumed to be 3%. Both bonds have a par value and redemption value of \$100. You are required to estimate the market price of each of the bonds if interest rates (yields):

- (i) increase by 1%;
- (ii) decrease by 1%.

[Given $PVF(2.5\%, 30) = 0.4767$, $PVF(3\%, 30) = 0.412$, $PVF(3.5\%, 30) = 0.3563$]

[Answer: (i) Zero Coupon Bond-13·1% (Decrease) & 12% Gilt June 2018- 8·1% (Decrease) (ii) Zero Coupon Bond-15·3% (Increase) & 12% Gilt June 2018- 9·1% (Increase)]

Question 3

It is now January 1, 2009, and Mr. X is considering the purchase of an outstanding Municipal Corporation bond that was issued on January 1, 2007, the Municipal bond has a 9.5 percent annual coupon and a 30-year original maturity (it matures on December 31, 2037). Interest rates have declined since the bond was issued, and the bond now is selling at 116.575 % of par, or Rs.1,165.75. Determine the yield to maturity (YTM) of this bond for Mr. X.

(Answer: 8.22%)

PORTFOLIO THEORY

BASIC CONCEPTS AND FORMULAE

1. Introduction

Portfolio theory guides investors about the method of selecting securities that will provide the highest expected rate of return for any given degree of risk or that will expose the investor to a degree of risk for a given expected rate of return.

2. Different Portfolio Theories

Some of the important theories of portfolio management are:

(a) Traditional Approach

The traditional approach to portfolio management concerns itself with the investor's profile; definition of portfolio objectives with reference to maximising the investors' wealth which is subject to risk; investment strategy; diversification and selection of individual investment.

(b) Dow Jones Theory

The Dow Jones theory classifies the movements of the prices on the share market into three major categories:

- **Primary movements:** They reflect the trend of the stock market and last from one year to three years, or sometimes even more.
- **Secondary movements:** They are shorter in duration and are opposite in direction to the primary movements.
- **Daily fluctuations:** These are irregular fluctuations which occur every day in the market. These fluctuations are without any definite trend.

Dow Jones theory identifies the turn in the market prices by seeing whether the successive peaks and troughs are higher or lower than earlier.

(c) Efficient Market Theory

The basic premise of this theory is that all market participants receive and act on all the relevant information as soon as it becomes available in the

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stock market. There exists three levels of market efficiency:-

- *Weak form efficiency* – Prices reflect all information found in the record of past prices and volumes.
- *Semi – Strong efficiency* – Prices reflect not only all information found in the record of past prices and volumes but also all other publicly available information.
- *Strong form efficiency* – Prices reflect all available information public as well as private.

(d) Random Walk Theory

Random Walk hypothesis states that the behaviour of stock market prices is unpredictable and that there is no relationship between the present prices of the shares and their future prices. Basic premises of the theory are as follows:

- Prices of shares in stock market can never be predicted. The reason is that the price trends are not the result of any underlying factors, but that they represent a statistical expression of past data.
- There may be periodical ups or downs in share prices, but no connection can be established between two successive peaks (high price of stocks) and troughs (low price of stocks).

(e) Markowitz Model of Risk-Return Optimization

According to the model, investors are mainly concerned with two properties of an asset: risk and return, but by diversification of portfolio it is possible to trade off between them. The essence of the theory is that risk of an individual asset hardly matters to an investor. The investor is more concerned to the contribution it makes to his total risk.

Efficient Frontier: Markowitz has formalised the risk return relationship and developed the concept of efficient frontier. For selection of a portfolio, comparison between combinations of portfolios is essential. The investor has to select a portfolio from amongst all those represented by the efficient frontier. This will depend upon his risk-return preference. As different investors have different preferences with respect to expected return and risk, the optimal portfolio of securities will vary considerably among investors.

As a rule, a portfolio is not efficient if there is another portfolio with:

- A higher expected value of return and a lower standard deviation (risk).

- A higher expected value of return and the same standard deviation (risk)
- The same expected value but a lower standard deviation (risk)

(f) Capital Asset Pricing Model (CAPM)

CAPM model describes the linear relationship risk-return trade-off for securities/portfolios. A graphical representation of CAPM is the Security Market Line, (SML), which indicates the rate of return required to compensate at a given level of risk. The risks to which a security/portfolio is exposed are divided into two groups, diversifiable and non-diversifiable.

The diversifiable risk can be eliminated through a portfolio consisting of large number of well diversified securities. Whereas, the non-diversifiable risk is attributable to factors that affect all businesses like Interest Rate Changes, Inflation, Political Changes, etc.

As diversifiable risk can be eliminated by an investor through diversification, the non-diversifiable risk is the only risk a business should be concerned with. The CAPM method also is solely concerned with non-diversifiable risk.

The non-diversifiable risks are assessed in terms of beta coefficient, β , through fitting regression equation between return of a security/portfolio and the return on a market portfolio.

$$R_j = R_f + \beta (R_m - R_f)$$

Where,

R_f = Risk free rate

R_m = Market Rate

β = Beta of Portfolio

(g) Arbitrage Pricing Theory Model (APT)

The APT was developed by Ross in 1976. It holds that there are four factors which explain the risk premium relationship of a particular security-inflation and money supply, interest rate, industrial production and personal consumption. It is a multi-factor model having a whole set of Beta Values – one for each factor. Further, it states that the expected return on an investment is dependent upon how that investment reacts to a set of individual macro-economic factors (degree of reaction measured by the Betas) and the risk premium associated with each of the macro – economic

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factors.

$$E(R_i) = R_f + \lambda_1 b_{i_1} + \lambda_2 b_{i_2} + \lambda_3 b_{i_3} + \lambda_4 b_{i_4}$$

Where, $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ are average risk premium for each of the four factors in the model and $b_{i_1}, b_{i_2}, b_{i_3}, b_{i_4}$ are measures of sensitivity of the particular security i to each of the four factors.

(h) Sharpe Index Model

William Sharpe developed the Single index model. The single index model is based on the assumption that stocks vary together because of the common movement in the stock market and there are no effects beyond the market (i.e. any fundamental factor effects) that account the stocks co-movement. The expected return, standard deviation and co-variance of the single index model represent the joint movement of securities. The return on stock is:

$$R_i = a_i + b_i R_m + \hat{\epsilon}_i$$

The mean return is:

$$R_i = a_i + b_i R_m + \hat{\epsilon}_i$$

Where,

R_i = expected return on security i

a_i = intercept of the straight line or alpha co-efficient

b_i = slope of straight line or beta co-efficient

R_m = the rate of return on market index

$\hat{\epsilon}_i$ = error term.

The variance of security's return:

$$s_i^2 = b_i^2 s_m^2 + s_{\hat{\epsilon}_i}^2$$

The covariance of returns between securities i and j is:

$$s_{ij} = b_i b_j s_m^2$$

Systematic risk = $b_i^2 \times$ variance of market index

$$= b_i^2 s_m^2$$

Unsystematic risk = Total variance - Systematic risk.

$$\hat{\sigma}_i^2 = \sigma_i^2 - \text{Systematic risk.}$$

Thus, the total risk = Systematic risk + Unsystematic risk.

$$= b_i^2 \sigma_m^2 + \hat{\sigma}_i^2.$$

Portfolio variance can be derived

$$\sigma_p^2 = \sum_{i=1}^N x_i b_i \sigma_m^2 + \sum_{i=1}^N x_i^2 \hat{\sigma}_i^2$$

Expected return on the portfolio

$$R_p = \sum_{i=1}^N x_i (a_i + b_i R_m)$$

A portfolio's alpha value is a weighted average of the alpha values for its component securities using the proportion of the investment in a security as weight.

$$\alpha_p = \sum_{i=1}^N x_i \alpha_i$$

A portfolio's beta value is the weighted average of the beta values of its component stocks using relative share of them in the portfolio as weights.

$$\beta_p = \sum_{i=1}^N x_i b_i$$

(i) Sharpe's Optimal Portfolio

Sharpe had provided a model for the selection of appropriate securities in a portfolio. The selection of any stock is directly related to its excess return-beta ratio.

$$\frac{R_i - R_f}{B_i}$$

Where,

R_i = Expected return on stock

R_f = Return on a risk less asset

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B_i = Expected change in the rate of return on stock "i" associated with one unit change in the market return.

3. Portfolio Management

The objective of portfolio management is to achieve the maximum return from a portfolio which has been delegated to be managed by an individual manager or a financial institution. The manager has to balance the parameters which define a good investment i.e. security, liquidity and return. The goal is to obtain the highest return for the investor of the portfolio.

(a) Objectives of Portfolio Management

- (i) Security/Safety of Principal;
- (ii) Stability of Income;
- (iii) Capital Growth;
- (iv) Marketability i.e. the ease with which a security can be bought or sold;
- (v) Liquidity i.e. nearness to money;
- (vi) Diversification; and
- (vii) Favourable Tax Status.

(b) Activities in Portfolio Management

The following three major activities are involved in an efficient portfolio management:

- (i) Identification of assets or securities, allocation of investment and identifying asset classes.
- (ii) Deciding about major weights/proportion of different assets/securities in the portfolio.
- (iii) Security selection within the asset classes as identified earlier.

(c) Basic Principles of Portfolio Management

- (i) Effective investment planning for the investment in securities; and
- (ii) Constant review of investment.

(d) Factors Affecting Investment Decision in Portfolio Management

Given a certain amount of funds, the investment decision basically depends upon the following factors:

- (i) Objectives of Investment Portfolio
- (ii) Selection of Investment, and
- (iii) Timing of Purchases.

(e) Formulation of Portfolio Strategy

- (i) **Active Portfolio Strategy (APS):** An APS is followed by most investment professionals and aggressive investors who strive to earn superior return after adjustment for risk.
- (ii) **Passive Portfolio Strategy:** Passive strategy rests on the tenet that the capital market is fairly efficient with respect to the available information.

4. Equity Style Management

Pioneered by Nobel laureate William Sharpe, equity style management is derived from a correlation analysis of various equity style categories such as value, growth, small cap, large cap and foreign stocks.

5. Principles and Management of Hedge Funds

Hedge Fund is an aggressively managed portfolio of investments that uses advanced investment strategies such as leverage, long, short and derivative positions in both domestic and international markets with the goal of generating high returns.

6. International Portfolio Management

The objective of portfolio investment management is to consider an optimal portfolio where the risk-return trade off is optimal. The return may be maximum at a certain level of risk or the risk may be minimum at a certain level of return. It is therefore necessary to determine whether optimization of international portfolio can be achieved by striking a balance between risk and return.

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7. Important Formulae

(a) Expected Return from a Security

$$1 + R_{HC} = [1 + (S_1 - S_0 + I) / S_0] \times 1 + e$$

Where,

S_0 = Home country currency value of security during preceding time period t_0

S_1 = Home country currency value of security during succeeding time period t_1

I = Income from interest and dividend

e = Change in exchange rate.

(b) Portfolio Return

$$R_P = R_A W_A + R_B W_B$$

(c) Covariance between two sets of returns A_1 , and A_2 is given by:

$$\text{Cov}(A_1, A_2) = P_1(A_1 - \bar{A}_1)(A_2 - \bar{A}_2) + P_2(A_1 - \bar{A}_1)(A_2 - \bar{A}_2)$$

$$\text{Correlation Coefficient } r_{12} = \frac{\text{Cov}(A_1, A_2)}{S_1 S_2}$$

(d) Portfolio Risk

$$S_p = \sqrt{w_1^2 \text{Var } A_1 + w_2^2 \text{Var } A_2 + 2(w_1)(w_2) \text{Cov}(A_1, A_2)}$$

Question 1

Write short note on Factors affecting investment decisions in portfolio management.

Answer

Factors affecting Investment Decisions in Portfolio Management

- (i) **Objectives of investment portfolio:** There can be many objectives of making an investment. The manager of a provident fund portfolio has to look for security (low risk) and may be satisfied with none too higher return. An aggressive investment company may, however, be willing to take a high risk in order to have high capital appreciation.
- (ii) **Selection of investment**
 - (a) What types of securities to buy or invest in? There is a wide variety of investments opportunities available i.e. debentures, convertible bonds,

preference shares, equity shares, government securities and bonds, income units, capital units etc.

- (b) What should be the proportion of investment in fixed interest/dividend securities and variable interest/dividend bearing securities?
 - (c) In case investments are to be made in the shares or debentures of companies, which particular industries show potential of growth?
 - (d) Once industries with high growth potential have been identified, the next step is to select the particular companies, in whose shares or securities investments are to be made.
- (iii) Timing of purchase: At what price the share is acquired for the portfolio depends entirely on the timing decision. It is obvious if a person wishes to make any gains, he should “buy cheap and sell dear” i.e. buy when the shares are selling at a low price and sell when they are at a high price.

Question 2

- (a) *What sort of investor normally views the variance (or Standard Deviation) of an individual security's return as the security's proper measure of risk?*
- (b) *What sort of investor rationally views the beta of a security as the security's proper measure of risk? In answering the question, explain the concept of beta.*

Answer

- (a) A rational risk-averse investor views the variance (or standard deviation) of her portfolio's return as the proper risk of her portfolio. If for some reason or another the investor can hold only one security, the variance of that security's return becomes the variance of the portfolio's return. Hence, the variance of the security's return is the security's proper measure of risk.

While risk is broken into diversifiable and non-diversifiable segments, the market generally does not reward for diversifiable risk since the investor himself is expected to diversify the risk himself. However, if the investor does not diversify he cannot be considered to be an efficient investor. The market, therefore, rewards an investor only for the non-diversifiable risk. Hence, the investor needs to know how much non-diversifiable risk he is taking. This is measured in terms of beta.

An investor therefore, views the beta of a security as a proper measure of risk, in evaluating how much the market reward him for the non-diversifiable risk that he is assuming in relation to a security. An investor who is evaluating the non-diversifiable element of risk, that is, extent of deviation of returns viz-a-viz the market therefore consider beta as a proper measure of risk.

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- (b) If an individual holds a diversified portfolio, she still views the variance (or standard deviation) of her portfolio's return as the proper measure of the risk of her portfolio. However, she is no longer interested in the variance of each individual security's return. Rather she is interested in the contribution of each individual security to the variance of the portfolio.

Under the assumption of homogeneous expectations, all individuals hold the market portfolio. Thus, we measure risk as the contribution of an individual security to the variance of the market portfolio. The contribution when standardized properly is the beta of the security. While a very few investors hold the market portfolio exactly, many hold reasonably diversified portfolio. These portfolios are close enough to the market portfolio so that the beta of a security is likely to be a reasonable measure of its risk.

In other words, beta of a stock measures the sensitivity of the stock with reference to a broad based market index like BSE sensex. For example, a beta of 1.3 for a stock would indicate that this stock is 30 per cent riskier than the sensex. Similarly, a beta of 0.8 would indicate that the stock is 20 per cent ($100 - 80$) less risky than the sensex. However, a beta of one would indicate that the stock is as risky as the stock market index.

Question 3

Distinguish between 'Systematic risk' and 'Unsystematic risk'.

Answer

Systematic risk refers to the variability of return on stocks or portfolio associated with changes in return on the market as a whole. It arises due to risk factors that affect the overall market such as changes in the nation's economy, tax reform by the Government or a change in the world energy situation. These are risks that affect securities overall and, consequently, cannot be diversified away. This is the risk which is common to an entire class of assets or liabilities. The value of investments may decline over a given time period simply because of economic changes or other events that impact large portions of the market. Asset allocation and diversification can protect against systematic risk because different portions of the market tend to underperform at different times. This is also called market risk.

Unsystematic risk however, refers to risk unique to a particular company or industry. It is avoidable through diversification. This is the risk of price change due to the unique circumstances of a specific security as opposed to the overall market. This risk can be virtually eliminated from a portfolio through diversification.

Question 4

Briefly explain the objectives of "Portfolio Management".

Answer

Objectives of Portfolio Management

Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. The management may be by professionals or others or by individuals themselves. A portfolio of an individual or a corporate unit is the holding of securities and investment in financial assets. These holdings are the result of individual preferences and decisions regarding risk and return.

The investors would like to have the following objectives of portfolio management:

- (a) Capital appreciation.
- (b) Safety or security of an investment.
- (c) Income by way of dividends and interest.
- (d) Marketability.
- (e) Liquidity.
- (f) Tax Planning - Capital Gains Tax, Income tax and Wealth Tax.
- (g) Risk avoidance or minimization of risk.
- (h) Diversification, i.e. combining securities in a way which will reduce risk.

It is necessary that all investment proposals should be assessed in terms of income, capital appreciation, liquidity, safety, tax implication, maturity and marketability i.e., saleability (i.e., saleability of securities in the market). The investment strategy should be based on the above objectives after a thorough study of goals of the investor, market situation, credit policy and economic environment affecting the financial market.

The portfolio management is a complex task. Investment matrix is one of the many approaches which may be used in this connection. The various considerations involved in investment decisions are liquidity, safety and yield of the investment. Image of the organization is also to be taken into account. These considerations may be taken into account and an overall view obtained through a matrix approach by allotting marks for each consideration and totaling them.

Question 5

Discuss the various kinds of Systematic and Unsystematic risk?

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Answer

There are two types of Risk - Systematic (or non-diversifiable) and unsystematic (or diversifiable) relevant for investment - also, called as general and specific risk.

Types of Systematic Risk

- (i) *Market risk:* Even if the earning power of the corporate sector and the interest rate structure remain more or less unchanged prices of securities, equity shares in particular, tend to fluctuate. Major cause appears to be the changing psychology of the investors. The irrationality in the security markets may cause losses unrelated to the basic risks. These losses are the result of changes in the general tenor of the market and are called market risks.
- (ii) *Interest Rate Risk:* The change in the interest rate has a bearing on the welfare of the investors. As the interest rate goes up, the market price of existing fixed income securities falls and vice versa. This happens because the buyer of a fixed income security would not buy it at its par value or face value if its fixed interest rate is lower than the prevailing interest rate on a similar security.
- (iii) *Social or Regulatory Risk:* The social or regulatory risk arises, where an otherwise profitable investment is impaired as a result of adverse legislation, harsh regulatory climate, or in extreme instance nationalization by a socialistic government.
- (iv) *Purchasing Power Risk:* Inflation or rise in prices lead to rise in costs of production, lower margins, wage rises and profit squeezing etc. The return expected by investors will change due to change in real value of returns.

Classification of Unsystematic Risk

- (i) *Business Risk:* As a holder of corporate securities (equity shares or debentures) one is exposed to the risk of poor business performance. This may be caused by a variety of factors like heightened competition, emergence of new technologies, development of substitute products, shifts in consumer preferences, inadequate supply of essential inputs, changes in governmental policies and so on. Often of course the principal factor may be inept and incompetent management.
- (ii) *Financial Risk:* This relates to the method of financing, adopted by the company, high leverage leading to larger debt servicing problem or short term liquidity problems due to bad debts, delayed receivables and fall in current assets or rise in current liabilities.
- (iii) *Default Risk:* Default risk refers to the risk accruing from the fact that a borrower may not pay interest and/or principal on time. Except in the case of highly risky debt instrument, investors seem to be more concerned with the perceived risk of

default rather than the actual occurrence of default. Even though the actual default may be highly unlikely, they believe that a change in the perceived default risk of a bond would have an immediate impact on its market price.

Question 6

Discuss the Capital Asset Pricing Model (CAPM) and its relevant assumptions.

Answer

Capital Asset Pricing Model: The mechanical complexity of the Markowitz's portfolio model kept both practitioners and academics away from adopting the concept for practical use. Its intuitive logic, however, spurred the creativity of a number of researchers who began examining the stock market implications that would arise if all investors used this model. As a result, what is referred to as the Capital Asset Pricing Model (CAPM), was developed.

The Capital Asset Pricing Model was developed by Sharpe, Mossin and Linter in 1960. The model explains the relationship between the expected return, non diversifiable risk and the valuation of securities. It considers the required rate of return of a security on the basis of its contribution to the total risk. It is based on the premises that the diversifiable risk of a security is eliminated when more and more securities are added to the portfolio. However, the systematic risk cannot be diversified and is related with that of the market portfolio. All securities do not have same level of systematic risk. The systematic risk can be measured by beta, β under CAPM, the expected return from a security can be expressed as:

Expected return on security = $R_f + \text{Beta} (R_m - R_f)$

The model shows that the expected return of a security consists of the risk-free rate of interest and the risk premium. The CAPM, when plotted on the graph paper is known as the Security Market Line (SML). A major implication of CAPM is that not only every security but all portfolios too must plot on SML. This implies that in an efficient market, all securities are expected returns commensurate with their riskiness, measured by β .

Relevant Assumptions of CAPM

- (i) The investor's objective is to maximize the utility of terminal wealth;
- (ii) Investors make choices on the basis of risk and return;
- (iii) Investors have identical time horizon;
- (iv) Investors have homogeneous expectations of risk and return;
- (v) Information is freely and simultaneously available to investors;
- (vi) There is risk-free asset, and investor can borrow and lend unlimited amounts at the risk-free rate;

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(vii) There are no taxes, transaction costs, restrictions on short rates or other market imperfections;

(viii) Total asset quantity is fixed, and all assets are marketable and divisible.

CAPM can be used to estimate the expected return of any portfolio with the following formula:

$$E(R_p) = R_f + B_p [E(R_m) - R_f]$$

Where,

$E(R_p)$ = Expected return of the portfolio

R_f = Risk free rate of return

B_p = Portfolio beta i.e. market sensitivity index.

$E(R_m)$ = Expected return on market portfolio

$E(R_m) - R_f$ = Market risk premium

CAPM provides a conceptual frame work for evaluating any investment decision where capital is committed with a goal of producing future returns.

Question 7

John inherited the following securities on his uncle's death:

Types of Security	Nos.	Annual Coupon %	Maturity Years	Yield %
Bond A (Rs. 1,000)	10	9	3	12
Bond B (Rs. 1,000)	10	10	5	12
Preference shares C (Rs. 100)	100	11	*	13*
Preference shares D (Rs. 100)	100	12	*	13*

**likelihood of being called at a premium over par.*

Compute the current value of his uncle's portfolio.

Answer

Computation of current value of John's portfolio

(i) 10 Nos. Bond A, Rs. 1,000 par value, 9% Bonds maturity 3 years:

Rs.

Current value of interest on bond A

1-3 years: Rs. 900 $\times$ Cumulative P.V. @ 12% (1-3 years)

	= Rs. 900 ´ 2.402	2,162	
	Add: Current value of amount received on maturity of Bond A		
	End of 3rd year: Rs. 1,000 ´ 10 ´ P.V. @ 12% (3rd year)		
	= Rs. 10,000 ´ 0.712	<u>7,120</u>	9,282
(ii)	10 Nos. Bond B, Rs. 1,000 par value, 10% Bonds maturity 5 years:		
	Current value of interest on bond B		
	1-5 years: Rs. 1,000 ´ Cumulative P.V. @ 12% (1-5 years)		
	= Rs. 1,000 ´ 3.605	3,605	
	Add: Current value of amount received on maturity of Bond B		
	End of 5th year: Rs. 1,000 ´ 10 ´ P.V. @ 12% (5 th year)		
	= Rs. 10,000 ´ 0.567	<u>5,670</u>	9,275
(iii)	100 Preference shares C, Rs. 100 par value, 11% coupon		
	$\frac{11\% \times 100 \text{ Nos.} \times \text{Rs. } 100}{13\%} = \frac{1,100}{0.13}$	8,462	
(iv)	100 Preference shares D, Rs. 100 par value, 12% coupon		
	$\frac{12\% \times 100 \text{ Nos.} \times \text{Rs. } 100}{13\%} = \frac{1,200}{0.13}$	<u>9,231</u>	17,693
	Total current value of his portfolio [(i) + (ii) + (iii) + (iv)]		<u>36,250</u>

Question 8

A Ltd. has an expected return of 22% and Standard deviation of 40%. B Ltd. has an expected return of 24% and Standard deviation of 38%. A Ltd. has a beta of 0.86 and B Ltd. a beta of 1.24. The correlation coefficient between the return of A Ltd. and B Ltd. is 0.72. The Standard deviation of the market return is 20%. Suggest:

- Is investing in B Ltd. better than investing in A Ltd.?
- If you invest 30% in B Ltd. and 70% in A Ltd., what is your expected rate of return and portfolio Standard deviation?
- What is the market portfolios expected rate of return and how much is the risk-free rate?
- What is the beta of Portfolio if A Ltd.'s weight is 70% and B Ltd.'s weight is 30%?

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Answer

- (i) A Ltd. has lower return and higher risk than B Ltd. investing in B Ltd. is better than in A Ltd. because the returns are higher and the risk, lower. However, investing in both will yield diversification advantage.

(ii) $r_{AB} = .22 \times 0.7 + .24 \times 0.3 = 22.6\%$

$$s_{AB}^2 = \sqrt{.40^2 \times 0.7^2 + .38^2 \times 0.3^2 + 2 \times 0.7 \times 0.3 \times 0.72 \times .40 \times .38} = .1374$$

$$s_{AB} = \sqrt{s_{AB}^2}$$

$$= \sqrt{.1374} = .37 = 37\% *$$

* Answer = 37.06% is also correct and variation may occur due to approximation.

- (iii) This risk-free rate will be the same for A and B Ltd. Their rates of return are given as follows:

$$r_A = 22 = r_f + (r_m - r_f) 0.86$$

$$r_B = 24 = r_f + (r_m - r_f) 1.24$$

$$r_A - r_B = -2 = (r_m - r_f) (-0.38)$$

$$r_m - r_f = -2 / -0.38 = 5.26\%$$

$$r_A = 22 = r_f + (5.26) 0.86$$

$$r_f = 17.5\% *$$

$$r_B = 24 = r_f + (5.26) 1.24$$

$$r_f = 17.5\% *$$

$$r_m - 17.5 = 5.26$$

$$r_m = 22.76\% **$$

*Answer = 17.47% might occur due to variation in approximation.

**Answer may show small variation due to approximation. Exact answer is 22.736%.

- (iv) $b_{AB} = b_A \times W_A + b_B \times W_B$
 $= 0.86 \times 0.7 + 1.24 \times 0.3 = 0.974$

Question 9

Following is the data regarding six securities:

	A	B	C	D	E	F
Return (%)	8	8	12	4	9	8
Risk (Standard deviation)	4	5	12	4	5	6

- (i) Assuming three will have to be selected, state which ones will be picked.
- (ii) Assuming perfect correlation, show whether it is preferable to invest 75% in A and 25% in C or to invest 100% in E.

Answer

- (i) Security A has a return of 8% for a risk of 4, whereas B and F have a higher risk for the same return. Hence, among them A dominates.

For the same degree of risk 4, security D has only a return of 4%. Hence, D is also dominated by A.

Securities C and E remain in reckoning as they have a higher return though with higher degree of risk.

Hence, the ones to be selected are A, C & E.

- (ii) The average values for A and C for a proportion of 3 : 1 will be :

$$\text{Risk} = \frac{(3 \times 4) + (1 \times 12)}{4} = 6\%$$

$$\text{Return} = \frac{(3 \times 8) + (1 \times 12)}{4} = 9\%$$

Therefore:	75% A	E
	25% C	—
Risk	6	5
Return	9%	9%

For the same 9% return the risk is lower in E. Hence, E will be preferable.

Question 10

An investor is holding 1,000 shares of Fatlass Company. Presently the rate of dividend being paid by the company is Rs. 2 per share and the share is being sold at Rs. 25 per share in the market. However, several factors are likely to change during the course of the year as indicated below:

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	<i>Existing</i>	<i>Revised</i>
<i>Risk free rate</i>	12%	10%
<i>Market risk premium</i>	6%	4%
<i>Beta value</i>	1.4	1.25
<i>Expected growth rate</i>	5%	9%

In view of the above factors whether the investor should buy, hold or sell the shares? And why?

Answer

On the basis of existing and revised factors, rate of return and price of share is to be calculated.

Existing rate of return

$$= R_f + \text{Beta} (R_m - R_f)$$

$$= 12\% + 1.4 (6\%) = 20.4\%$$

Revised rate of return

$$= 10\% + 1.25 (4\%) = 15\%$$

Price of share (original)

$$P_o = \frac{D(1+g)}{K_e - g} = \frac{2(1.05)}{.204 - .05} = \frac{2.10}{.154} = \text{Rs. } 13.63$$

Price of share (Revised)

$$P_o = \frac{2(1.09)}{.15 - .09} = \frac{2.18}{.06} = \text{Rs. } 36.33$$

In case of existing market price of Rs. 25 per share, rate of return (20.4%) and possible equilibrium price of share at Rs. 13.63, this share needs to be sold because the share is overpriced (Rs. 25 – 13.63) by Rs. 11.37. However, under the changed scenario where growth of dividend has been revised at 9% and the return though decreased at 15% but the possible price of share is to be at Rs. 36.33 and therefore, in order to expect price appreciation to Rs. 36.33 the investor should hold the shares, if other things remain the same.

Question 11

Your client is holding the following securities:

Particulars of Securities	Cost Rs.	Dividends Rs.	Market Price Rs.	BETA
<i>Equity Shares:</i>				
Co. X	8,000	800	8,200	0.8
Co. Y	10,000	800	10,500	0.7
Co. Z	16,000	800	22,000	0.5
PSU Bonds	34,000	3,400	32,300	1.0

Assuming a Risk-free rate of 15%, calculate:

- Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).
- Average return of the portfolio.

Answer

Calculation of expected return on market portfolio (R_m)

Investment	Cost (Rs.)	Dividends (Rs.)	Capital Gains (Rs.)
Shares X	8,000	800	200
Shares Y	10,000	800	500
Shares Z	16,000	800	6,000
PSU Bonds	<u>34,000</u>	<u>3,400</u>	<u>-1,700</u>
	<u>68,000</u>	<u>5,800</u>	<u>5,000</u>

$$R_m = \frac{5,800 + 5,000}{68,000} \times 100 = 15.88\%$$

Calculation of expected rate of return on individual security:

Security:

Shares X :	$15 + 0.8 (15.88 - 15.0)$	= 15.70%
Shares Y :	$15 + 0.7 (15.88 - 15.0)$	= 15.62%
Shares Z :	$15 + 0.5 (15.88 - 15.0)$	= 15.44%
PSU Bonds :	$15 + 1.0 (15.88 - 15.0)$	= 15.88%

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Calculation of the Average Return of the Portfolio:

$$= \frac{15.70 + 15.62 + 15.44 + 15.88}{4}$$

$$= 15.66\%.$$

Question 12

The rates of return on the security of Company X and market portfolio for 10 periods are given below:

Period	Return of Security X (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

- (i) What is the beta of Security X?
(ii) What is the characteristic line for Security X?

Answer

(i)

Period	R_X	R_M	$R_X - \bar{R}_X$	$R_M - \bar{R}_M$	$(R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$(R_M - \bar{R}_M)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16
5	18	20	3	8	24	64
6	-5	8	-20	-4	80	16

7	17	-6	2	-18	-36	324
8	19	5	4	-7	-28	49
9	-7	6	-22	-6	132	36
10	<u>20</u>	<u>11</u>	5	-1	<u>-5</u>	<u>1</u>
	150	120			357	706
	ΣR_X	ΣR_M			$\Sigma (R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$\Sigma (R_M - \bar{R}_M)^2$

$$\bar{R}_X = 15 \quad \bar{R}_M = 12$$

$$S^2_M = \frac{\Sigma (R_M - \bar{R}_M)^2}{n - 1} = \frac{706}{9} = 78.44$$

$$\text{Cov}_{X, M} = \frac{\Sigma (R_X - \bar{R}_X) (R_M - \bar{R}_M)}{n - 1} = \frac{357}{9} = 39.66$$

$$\text{Beta}_X = \frac{\text{Cov}_{X, M}}{S^2_M} = \frac{39.66}{78.44} = .505$$

$$(ii) \quad \bar{R}_X = 15 \quad \bar{R}_M = 12$$

$$y = a + bx$$

$$15 = a + 0.505 \times 12$$

$$\begin{aligned} \text{Alpha (a)} &= 15 - (0.505 \times 12) \\ &= 8.94\% \end{aligned}$$

$$\text{Characteristic line for security X} = a + b \times R_M$$

Where,

R_M = Expected return on Market Index

\ Characteristic line for security X = 8.94 + 0.505 R_M

Strategic Financial Management

Question 13

Following is the data regarding six securities:

	U	V	W	X	Y	Z
Return (%)	10	10	15	5	11	10
Risk (%) (Standard deviation)	5	6	13	5	6	7

- (i) Which of three securities will be selected?
- (ii) Assuming perfect correlation, analyse whether it is preferable to invest 80% in security U and 20% in security W or to invest 100% in Y.

Answer

- (i) When we make risk-return analysis of different securities from U to Z, we can observe that security U gives a return of 10% at risk level of 5%. Simultaneously securities V and Z give the same return of 10% as of security U, but their risk levels are 6% and 7% respectively. Security X is giving only 5% return for the risk rate of 5%. Hence, security U dominates securities V, X and Z.

Securities W and Y offer more return but it carries higher level of risk.

Hence securities U, W and Y can be selected based on individual preferences.

- (ii) In a situation where the perfect positive correlation exists between two securities, their risk and return can be averaged with the proportion.

Assuming the perfect correlation exists between the securities U and W, average risk and return of U and W together for proportion 4 : 1 is calculated as follows:

$$\text{Risk} = (4 \times .05 + 1 \times .13) \div 5 = 6.6\%$$

$$\text{Return} = (4 \times .10 + 1 \times .15) \div 5 = 11\%$$

When we compare risk of 6.6% and return of 11% with security Y with 6% risk and 11% return, security Y is preferable over the portfolio of securities U and W in proportion of 4 : 1

Question 14

Given below is information of market rates of Returns and Data from two Companies A and B:

	Year 2007	Year 2008	Year 2009
Market (%)	12.0	11.0	9.0
Company A (%)	13.0	11.5	9.8
Company B (%)	11.0	10.5	9.5

You are required to determine the beta coefficients of the Shares of Company A and Company B.

Answer

Company A:

Year	Return % (Ra)	Market return % (Rm)	Deviation R(a)	Deviation Rm	D Ra ´ D Rm	Rm ²
1	13.0	12.0	1.57	1.33	2.09	1.77
2	11.5	11.0	0.07	0.33	0.02	0.11
3	<u>9.8</u>	<u>9.0</u>	- 1.63	- 1.67	<u>2.72</u>	<u>2.79</u>
	<u>34.3</u>	<u>32.0</u>			<u>4.83</u>	<u>4.67</u>

Average Ra = 11.43

Average Rm = 10.67

$$\text{Covariance} = \frac{4.83}{2} = 2.42$$

$$\beta = \frac{2.42}{2.34} = 1.03$$

Company B:

Year	Return % (Ra)	Market return % (Rm)	Deviation R(a)	Deviation Rm	D Ra ´ D Rm	Rm ²
1	11.0	12.0	0.67	1.33	0.89	1.77
2	10.5	11.0	0.17	0.33	0.06	0.11
3	<u>9.5</u>	<u>9.0</u>	- 0.83	- 1.67	<u>1.39</u>	<u>2.79</u>
	<u>31.0</u>	<u>32.0</u>			<u>2.34</u>	<u>4.67</u>

Average Ra = 10.33

Average Rm = 10.67

$$\text{Covariance} = \frac{2.34}{2} = 1.17$$

$$\beta = \frac{1.17}{2.34} = 0.50$$

Strategic Financial Management

Question 15

The Investment portfolio of a bank is as follows:

Government Bond	Coupon Rate	Purchase rate (F.V. Rs. 100 per Bond)	Duration (Years)
G.O.I. 2006	11.68	106.50	3.50
G.O.I. 2010	7.55	105.00	6.50
G.O.I. 2015	7.38	105.00	7.50
G.O.I. 2022	8.35	110.00	8.75
G.O.I. 2032	7.95	101.00	13.00

Face value of total Investment is Rs. 5 crores in each Government Bond.

Calculate actual Investment in portfolio.

What is a suitable action to churn out investment portfolio in the following scenario?

1. Interest rates are expected to lower by 25 basis points.
2. Interest rates are expected to raise by 75 basis points.

Also calculate the revised duration of investment portfolio in each scenario.

Answer

Calculation of Actual investment of Portfolio

Security	Purchase price	Investment (Rs. in lakhs)
GOI 2006	106.50	532.50*
GOI 2010	105.00	525.00
GOI 2015	105.00	525.00
GOI 2022	110.00	550.00
GOI 2032	101.00	<u>505.00</u>
	Total	<u>2,637.50</u>

$$* \frac{\text{Rs. 5 crores}}{\text{Rs. 100}} \times \text{Rs. 106.50} = \text{Rs. 532.50 lakhs}$$

$$\begin{aligned} \text{Average Duration} &= \frac{3.5 + 6.5 + 7.5 + 8.75 + 13.00}{5} \\ &= \frac{39.25}{5} = 7.85 \end{aligned}$$

Suitable action to churn out investment portfolio in following scenario is to reduce risk and to maximize profit or minimize losses.

- (1) Interest rates are expected to be lower by 25 basis points in such case increase the average duration by purchasing GOI 2032 and Disposing of GOI 2006.

$$\begin{aligned}\text{Revised average duration shall be} &= \frac{39.25 - 3.5 + 13}{5} \\ &= \frac{48.75}{5} = 9.75 \text{ years}\end{aligned}$$

- (2) Interest rates are expected to rise by 75 basis points in such case reduce the average duration by (*) Purchasing GOI 2010 and disposing of GOI 2032.

$$\begin{aligned}\text{Revised average duration shall be} &= \frac{39.25 - 13 + 6.5}{5} \\ &= \frac{32.75}{5} = 6.55 \text{ years}\end{aligned}$$

(*) Purchasing of GOI 2006 is not beneficial as maturity period is very short and 75 basis points is comparatively higher change.

Question 16

Your client is holding the following securities:

Particulars of Securities	Cost Rs.	Dividends/Interest Rs.	Market price Rs.	Beta
<i>Equity Shares:</i>				
Gold Ltd.	10,000	1,725	9,800	0.6
Silver Ltd.	15,000	1,000	16,200	0.8
Bronze Ltd.	14,000	700	20,000	0.6
GOI Bonds	36,000	3,600	34,500	1.0

Average return of the portfolio is 15.7%, calculate:

- Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).
- Risk free rate of return.

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Answer

<i>Particulars of Securities</i>	<i>Cost Rs.</i>	<i>Dividend</i>	<i>Capital gain</i>
Gold Ltd.	10,000	1,725	- 200
Silver Ltd.	15,000	1,000	1,200
Bronz Ltd.	14,000	700	6,000
GOI Bonds	36,000	3,600	- 1,500
Total	75,000	7,025	5,500

Expected rate of return on market portfolio

$$\frac{\text{Dividend Earned} + \text{Capital appreciation} \times 100}{\text{Initial investment}}$$

$$= \frac{\text{Rs. 7,025} + \text{Rs. 5,500} \times 100}{75,000}$$

= 16.7%

Risk free return

$$\text{Average of Betas} = \frac{0.6 + 0.8 + 0.6 + 1.0}{4}$$

Average of Betas = 0.75

Average return = Risk free return + Average Betas (Expected return – Risk free return)

$$15.7 = \text{Risk free return} + 0.75 (16.7 - \text{Risk free return})$$

Risk free return = 12.7%

Expected Rate of Return for each security is

$$\text{Rate of Return} = R_f + B (R_m - R_f)$$

$$\text{Gold Ltd.} = 12.7 + .6 (16.7 - 12.7) = 15.10\%$$

$$\text{Silver Ltd.} = 12.7 + .8 (16.7 - 12.7) = 15.90\%$$

$$\text{Bronz Ltd.} = 12.7 + .6 (16.7 - 12.7) = 15.10\%$$

$$\text{GOI Bonds} = 12.7 + 1.0 (16.7 - 12.7) = 16.70\%$$

Question 17

The distribution of return of security 'F' and the market portfolio 'P' is given below:

Probability	Return		%	
	F		P	
0.30	30		-10	
0.40	20		20	
0.30	0		30	

You are required to calculate the expected return of security 'F' and the market portfolio 'P', the covariance between the market portfolio and security and beta for the security.

Answer

Security F

Prob(P)	R _f	PxR _f	Deviations of F (R _f – ER _f)	(Deviation) ² of F	(Deviations) ² p
0.3	30	9	13	169	50.7
0.4	20	8	3	9	3.6
0.3	0	0	-17	289	<u>86.7</u>
ER _f =17					<u>Var_f=141</u>

STDEV s f = $\sqrt{141}$ = 11.87

Market Portfolio, P

R _M %	P _M	Exp. Return R _M x P _M	Deviation of P (R _M -ER _M)	(Deviation of P) ²	(Deviation) ² P _M	Deviation of F x (Deviation of P)	Deviation of F x Deviation of P) x P
-10	0.3	-3	-24	576	172.8	-312	-93.6
20	0.4	8	6	36	14.4	18	7.2
30	0.3	9	16	256	76.8	-272	-81.6
		ER _M =14			Var _M =264 s _M =16.25		=Co Var P _M =- 168

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$$\text{Beta} \frac{\text{Co Var } P_M}{S_M^2} = \frac{-168}{264} = -.636$$

Question 18

X Co., Ltd., invested on 1.4.2009 in certain equity shares as below:

<i>Name of Co.</i>	<i>No. of shares</i>	<i>Cost (Rs.)</i>
<i>M Ltd.</i>	<i>1,000 (Rs.100 each)</i>	<i>2,00,000</i>
<i>N Ltd.</i>	<i>500 (Rs.10 each)</i>	<i>1,50,000</i>

In September, 2009, 10% dividend was paid out by M Ltd. and in October, 2009, 30% dividend paid out by N Ltd. On 31.3.2010 market quotations showed a value of Rs.220 and Rs.290 per share for M Ltd. and N Ltd. respectively.

On 1.4.2010, investment advisors indicate (a) that the dividends from M Ltd. and N Ltd. for the year ending 31.3.2011 are likely to be 20% and 35%, respectively and (b) that the probabilities of market quotations on 31.3.2011 are as below:

<i>Probability factor</i>	<i>Price/share of M Ltd.</i>	<i>Price/share of N Ltd.</i>
<i>0.2</i>	<i>220</i>	<i>290</i>
<i>0.5</i>	<i>250</i>	<i>310</i>
<i>0.3</i>	<i>280</i>	<i>330</i>

You are required to:

- (i) Calculate the average return from the portfolio for the year ended 31.3.2010;*
- (ii) Calculate the expected average return from the portfolio for the year 2010-11; and*
- (iii) Advise X Co. Ltd., of the comparative risk in the two investments by calculating the standard deviation in each case.*

Answer

<i>Calculation of return on portfolio for 2009-10</i>	<i>(Calculation in Rs. / share)</i>	
	<i>M</i>	<i>N</i>
<i>Dividend received during the year</i>	<i>10</i>	<i>3</i>
<i>Capital gain/loss by 31.03.10</i>		
<i>Market value by 31.03.10</i>	<i>220</i>	<i>290</i>
<i>Cost of investment</i>	<i>200</i>	<i>300</i>

Portfolio Theory

Gain/loss	20	(-)10	
Yield	30	(-)7	
Cost	200	300	
% return	15%	(-)2.33%	
Weight in the portfolio	57	43	
Weighted average return			7.55%
Calculation of estimated return for 2010-11			
Expected dividend	20	3.5	
Capital gain by 31.03.11			
$(220 \times 0.2) + (250 \times 0.5) + (280 \times 0.3) - 220 = (253 - 220)$	33		
$(290 \times 0.2) + (310 \times 0.5) + (330 \times 0.3) - 290 = (312 - 290)$		22	
Yield	53	25.5	
*Market Value 01.04.10	220	290	
% return	24.09%	8.79%	
*Weight in portfolio $(1,000 \times 220) : (500 \times 290)$	60.3	39.7	
Weighted average (Expected) return			18.02%
(*The market value on 31.03.10 is used as the base for calculating yield for 10-11)			

Calculation of Standard Deviation

M Ltd.

Expected market value	Expected gain	Expected dividend	Expected yield	Deviations	Square of deviations	Probability factor	Sq. of d x prob.
220	0	20	20	-33	1089	0.2	217.80
250	30	20	50	-3	9	0.5	4.50
280	60	20	80	27	729	0.3	218.70
							441.00
Standard deviation						21	

N Ltd.

Expected market value	Expected gain	Expected dividend	Expected yield	Deviations	Square of deviations	Probability factor	Sq. of d x prob.
290	0	3.5	3.5	-22	484	0.2	96.80

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310	20	3.5	23.5	-2	4	0.5	2.00
330	40	3.5	43.5	18	324	0.3	97.20
							196.00

Standard deviation 14

Share of company M Ltd. is more risky as the S.D. is more than company N Ltd.

Question 19

Expected returns on two stocks for particular market returns are given in the following table:

Market Return	Aggressive	Defensive
7%	4%	9%
25%	40%	18%

You are required to calculate:

- The Betas of the two stocks.*
- Expected return of each stock, if the market return is equally likely to be 7% or 25%.*
- The Security Market Line (SML), if the risk free rate is 7.5% and market return is equally likely to be 7% or 25%.*
- The Alphas of the two stocks.*

Answer

- The Betas of two stocks:

$$\text{Aggressive stock} \quad - \quad 40\% - 4\% / 25\% - 7\% = 2$$

$$\text{Defensive stock} \quad - \quad 18\% - 9\% / 25\% - 7\% = 0.50$$

- Expected returns of the two stocks:-*

$$\text{Aggressive stock} \quad - \quad 0.5 \times 4\% + 0.5 \times 40\% = 22\%$$

$$\text{Defensive stock} \quad - \quad 0.5 \times 9\% + 0.5 \times 18\% = 13.5\%$$

- Expected return of market portfolio = $0.5 \times 7\% + 0.5 \times 25\% = 16\%$

$$\backslash \text{ Market risk prem.} = 16\% - 7.5\% = 8.5\%$$

$$\backslash \text{ SML is, required return} = 7.5\% + \beta_i 8.5\%$$

- Alpha for stock A = 0.22 $- (0.075 + 2 \times 0.085) = -2.5\%$

$$\text{Alpha for stock B} = 0.135 - (0.075 + 0.5 \times 0.085) = 1.75\%$$

Question 20

The historical rates of return of two securities over the past ten years are given. Calculate the Covariance and the Correlation coefficient of the two securities:

Years:	1	2	3	4	5	6	7	8	9	10
Security 1:	12	8	7	14	16	15	18	20	16	22
(Return per cent)										
Security 2:	20	22	24	18	15	20	24	25	22	20
(Return per cent)										

Answer

Calculation of Covariance

Year	R_1	Deviation ($R_1 - \bar{R}_1$)	R_2 ($R_2 - \bar{R}_2$)	Deviation	Product of deviations
1	12	-2.8	20	-1	2.8
2	8	-6.8	22	1	-6.8
3	7	-7.8	24	3	-23.4
4	14	-0.8	18	-3	2.4
5	16	1.2	15	-6	-7.2
6	15	0.2	20	-1	-0.2
7	18	3.2	24	3	9.6
8	20	5.2	25	4	20.8
9	16	1.2	22	1	1.2
10	22	7.2	20	-1	-7.2

$$\bar{R}_1 = \frac{148}{10} = 14.8$$

$$\bar{R}_2 = \frac{210}{10} = 21$$

$$-8.00$$

$$\text{Covariance} = \frac{\sum_{i=1}^N [R_1 - \bar{R}_1][R_2 - \bar{R}_2]}{N}$$

$$= -8/10 = -0.8$$

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For calculation of correlation, the standard deviations of the two securities are also required.

Calculation of Standard Deviation

Year	R ₁	R ₁ ²	R ₂	R ₂ ²
1	12	144	20	400
2	8	64	22	484
3	7	49	24	576
4	14	196	18	324
5	16	256	15	225
6	15	225	20	400
7	18	324	24	576
8	20	400	25	625
9	16	256	22	484
10	22	484	20	400
	148	2398	210	4494

Standard deviation of security 1:

$$\begin{aligned}
 S_1 &= \sqrt{\frac{N \sum R_1^2 - (\sum R_1)^2}{N^2}} \\
 &= \sqrt{\frac{(10 \times 2398) - (148)^2}{10 \times 10}} = \sqrt{\frac{23980 - 21904}{100}} \\
 &= \sqrt{20.76} = 4.56
 \end{aligned}$$

Standard deviation of security 2:

$$\begin{aligned}
 S_2 &= \sqrt{\frac{N \sum R_2^2 - (\sum R_2)^2}{N^2}} \\
 &= \sqrt{\frac{(10 \times 4494) - (210)^2}{10 \times 10}} = \sqrt{\frac{44940 - 44100}{100}} \\
 &= \sqrt{\frac{840}{100}} = \sqrt{8.4} = 2.90
 \end{aligned}$$

Correlation Coefficient

$$r_{12} = \frac{\text{Cov}}{S_1 S_2}$$

$$= \frac{-0.8}{4.56 \times 2.90} = \frac{-0.8}{13.22}$$

$$= -0.0605$$

Question 21

XYZ Ltd. has substantial cash flow and until the surplus funds are utilised to meet the future capital expenditure, likely to happen after several months, are invested in a portfolio of short-term equity investments, details for which are given below:

Investment	No. of shares	Beta	Market price per share Rs.	Expected dividend yield
I	60,000	1.16	4.29	19.50%
II	80,000	2.28	2.92	24.00%
III	1,00,000	0.90	2.17	17.50%
IV	1,25,000	1.50	3.14	26.00%

The current market return is 19% and the risk free rate is 11%.

Required to:

- Calculate the risk of XYZ's short-term investment portfolio relative to that of the market;
- Whether XYZ should change the composition of its portfolio.

Answer

(i) Computation of Beta of Portfolio

Investment	No. of shares	Market Price	Market Value	Dividend Yield	Dividend	Composition	β	Weighted β
I.	60,000	4.29	2,57,400	19.50%	50,193	0.2339	1.16	0.27
II.	80,000	2.92	2,33,600	24.00%	56,064	0.2123	2.28	0.48
III.	1,00,000	2.17	2,17,000	17.50%	37,975	0.1972	0.90	0.18
IV.	1,25,000	3.14	3,92,500	26.00%	1,02,050	0.3566	1.50	0.53
			<u>11,00,500</u>		<u>2,46,282</u>	<u>1.0000</u>		<u>1.46</u>

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$$\text{Return of the Port Folio} = \frac{2,46,282}{11,00,500} = 0.2238$$

$$\text{Beta of Port Folio} = 1.46$$

Market Risk implicit

$$0.2238 = 0.11 + \beta \times (0.19 - 0.11)$$

$$\text{Or, } 0.08 \beta + 0.11 = 0.2238$$

$$\beta = \frac{0.2238 - 0.11}{0.08} = 1.42$$

Market β implicit is 1.42 while the port folio β is 1.46. Thus the port folio is marginally risky compared to the market.

- (ii) The decision regarding change of composition may be taken by comparing the dividend yield (given) and the expected return as per CAPM as follows:

Expected return R_s as per CAPM is:

$$R_s = R_{RF} + (R_M - R_{RF}) \beta$$

$$\begin{aligned} \text{For investment I } R_s &= R_{RF} + (R_M - R_{RF}) \beta \\ &= .11 + (.19 - .11) 1.16 \\ &= 20.28\% \end{aligned}$$

$$\text{For investment II, } R_s = .11 + (.19 - .11) 2.28 = 29.24\%$$

$$\begin{aligned} \text{For investment III, } R_s &= .11 + (.19 - .11) .90 \\ &= 18.20\% \end{aligned}$$

$$\begin{aligned} \text{For investment IV, } R_s &= .11 + (.19 - .11) 1.50 \\ &= 23\% \end{aligned}$$

Comparison of dividend yield with the expected return R_s shows that the dividend yields of investment I, II and III are less than the corresponding R_s . So, these investments are over-priced and should be sold by the investor. However, in case of investment IV, the dividend yield is more than the corresponding R_s , so, XYZ Ltd. should increase its proportion.

Question 22

A company has a choice of investments between several different equity oriented mutual funds. The company has an amount of Rs.1 crore to invest. The details of the mutual funds are as follows:

Mutual Fund	Beta
A	1.6
B	1.0
C	0.9
D	2.0
E	0.6

Required:

- If the company invests 20% of its investment in the first two mutual funds and an equal amount in the mutual funds C, D and E, what is the beta of the portfolio?
- If the company invests 15% of its investment in C, 15% in A, 10% in E and the balance in equal amount in the other two mutual funds, what is the beta of the portfolio?
- If the expected return of market portfolio is 12% at a beta factor of 1.0, what will be the portfolios expected return in both the situations given above?

Answer

With 20% investment in each MF Portfolio Beta is the weighted average of the B etas of various securities calculated as below:

(i)	Investment	BETA	Investment (Rs. Lacs)	Weighted Investment
A		1.6	20	32
B		1	20	20
C		0.9	20	18
D		2	20	40
E		0.6	20	12
			100	122

Weighted BETA = 1.22

Expected Return = $1.22 \times 12 = 14.64\%$

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(ii) With varied percentages of investments portfolio beta is calculated as follows:

	BETA	Investment (Rs. Lacs)	Weighted Investment
A	1.6	15	24
B	1	30	30
C	0.9	15	13.5
D	2	30	60
E	0.6	10	6
		100	133.5

Weighted BETA = 1.335

Expected Return – $1.335 \times 12 = 16.02\%$

(iii) Expected return of the portfolio with pattern of investment as in case (i)

= $12\% \times 1.22$ i.e. 14.64%

Expected Return with pattern of investment as in case (ii) = $12\% \times 1.335$ i.e., 16.02%.

Question 23

A holds the following portfolio:

Share/Bond	Beta	Initial Price Rs	Dividends Rs.	Market Price at end of year Rs.
Epsilon Ltd.	0.8	25	2	50
Sigma Ltd.	0.7	35	2	60
Omega Ltd.	0.5	45	2	135
GOI Bonds	0.99	1,000	140	1,005

Calculate:

(i) The expected rate of return on his portfolio using Capital Asset Pricing Method (CAPM)

(ii) The average return of his portfolio.

Risk-free return is 14%.

Answer

(i) Expected rate of return

	Total Investments	Dividends	Capital Gains
Epsilon Ltd.	25	2	25
Sigma Ltd.	35	2	25
Omega Ltd.	45	2	90
GOI Bonds	<u>1,000</u>	<u>140</u>	<u>5</u>
	1,105	146	145
	=====	=====	=====

$$\text{Expected Return on market portfolio} = \frac{146 + 145}{1105} = 26.33\%$$

$$\text{CAPME}(R_p) = R_F + B [E(R_M) - R_F]$$

					%age
Epsilon Ltd	14+0.8	[26.33-14]	=	14+9.86	= 23.86
Sigma Ltd.	14+0.7	[26.33-14]	=	14+8.63	= 22.63
Omega Ltd.	14+0.5	[26.33-14]	=	14+6.17	= 20.17
GOI Bonds	14+0.99	[26.33-14]	=	14+12.21	= 26.21

(ii) Average Return of Portfolio

$$\frac{23.86 + 22.63 + 20.17 + 26.21}{4} = \frac{92.87}{4} = 23.22\%$$

OR

$$\frac{0.8 + 0.7 + 0.5 + 0.99}{4} = \frac{2.99}{4} = 0.7475$$

$$14 + 0.7475(26.33 - 14)$$

$$14 + 9.22 = 23.22\%$$

Question 24

Mr. A is interested to invest Rs.1,00,000 in the securities market. He selected two securities B and D for this purpose. The risk return profile of these securities are as follows :

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Security	Risk (S)	Expected Return (ER)
B	10%	12%
D	18%	20%

Co-efficient of correlation between B and D is 0.15.

You are required to calculate the portfolio return of the following portfolios of B and D to be considered by A for his investment.

- (i) 100 percent investment in B only;
- (ii) 50 percent of the fund in B and the rest 25 percent in D;
- (iii) 75 percent of the fund in B and the rest 25 percent in D; and
- (iv) 100 percent investment in D only.

Also indicate that which portfolio is best for him from risk as well as return point of view?

Answer

We have $E_p = W_1E_1 + W_3E_3 + \dots W_nE_n$

and for standard deviation $\sigma_p = \sqrt{\sum_{i=1}^n \sum_{j=1}^n W_i W_j r_{ij} \sigma_i \sigma_j}$

Substituting the respective values we get,

- (a) All funds invested in B

$$E_p = 12\%$$

$$\sigma_p = 10\%$$

- (b) 50% of funds in each of B & D

$$E_p = 16\%$$

$$\sigma_p = 10.9\%$$

- (c) 75% in B and 25% in D

$$E_p = 14\%$$

$$\sigma_p = 9.4\%$$

- (d) 25% in B and 75% in D

$$E_p = 18\%$$

$$\sigma_p = 14.15\%$$

(e) All funds in D

$$E_p = 20\%$$

$$\sigma_p = 18.0\%$$

In the terms of return, we see that portfolio (e) is the best portfolio. In terms of risk we see that portfolio (c) is the best portfolio.

EXERCISES

Question 1

Mr. Sunil Mukherjee has estimated probable under different macroeconomic conditions for the following three stocks:

Stock	Current price (Rs.)	Rates of return(%) during different macroeconomic scenarios		
		<i>Recession</i>	<i>Moderate growth</i>	<i>Boom</i>
Him Ice Ltd	12	-12	15	35
Kalahari Biotech	18	20	12	-5
Puma Softech	60	18	20	15

Mr. Sunil Mukherjee is exploring if it is possible to make any arbitrage profits from the above information. Using the given information you are required to construct an arbitrage portfolio and show the payoffs under the different economic scenarios.

(Answer: Construction of an arbitrage portfolio requires formation of a zero investment portfolio. If we short sell two stocks each of the Him Ice Ltd and Kalahari Biotech one stock of Puma Softech can be purchased and this portfolio will qualify as zero investment portfolio.)

Question 2

Assume that you have half your money invested in T, the media company, and the other half invested in U, the consumer product giant. The expected returns and standard deviations on the two investments are summarized below:

	T	U
Expected Return	14%	18%
Standard Deviation	25%	40%

Strategic Financial Management

Estimate the variance of the portfolio as a function of the correlation coefficient (Start with -1 and increase the correlation to $+1$ in 0.2 increments).

(Answer: For Correlation of -0.8 the variance will be 156.25 and other variances can be calculated accordingly)

Question 3

Suppose Mr. X in a world where there are only two assets, gold and stocks. He is interested in investing his money in one, the other or both as sets. Consequently he collects the following data on the returns on the two assets over the last six years.

	Gold	Stock Market
Average return	8%	20%
Standard deviation	25%	22%
Correlation	-	0.4

- (a) Mr. X is constrained to pick just one, which one he would choose?
- (b) Mr. Y, a friend of Mr. X argues that this is wrong. He says that Mr. X is ignoring the big payoffs that he can get on gold. How would Mr. X go about alleviating his concern?
- (c) How would a portfolio composed of equal proportions in gold and stocks do in terms of mean and variance?
- (d) Mr. X came to know that GPEC (a cartel of gold-producing countries) is going to vary the amount of gold it produces with stock prices in the country. (GPEC will produce less gold when stock markets are up and more when it is down.) What effect will this have on his portfolios? Explain.

(Answer: (a) Gold (b) The average return on gold is much less than that on the stock market. (c) 14% and 167.25 (d) The optimal amount to invest in gold would drop.)

FINANCIAL SERVICES ON INDIA

BASIC CONCEPTS

1. Introduction

Financial Services has a broad definition and it can be defined as the products and services offered by institutions like banks of various kinds for the facilitation of various financial transactions and other related activities in the world of finance like Investment Banking, Credit Rating, Consumer Finance, Housing Finance, Asset Restructuring, Mutual Fund Management Company, Depository Services, Debit Card etc.

2. Investment Banking

This term is mainly used to describe the business of raising capital for companies. Major players in global scenario include Goldman Sach, Merrill Lynch, and Morgan Stanley etc.

The main difference between traditional commercial banking system and investment banking system is that while commercial bank takes deposits for current and savings accounts from customers while an investment bank does not.

3. Credit Rating

Credit Rating means an assessment made from credit-risk evaluation, translated into current opinion as on a specific date on the quality of specific debt security issued. Credit Rating is a long process involving a series of chronological steps. In India Credit Rating Agencies started to be set up in 1990s. Major agencies are CRISIL, ICRA, and CARE etc.

Different agencies use different scores for rating. Although Credit Rating is very advantageous for users as well as investors, but it also suffers from some serious limitations like credit quality may not be constant, information usually provided by the company to be assessed, etc.

4. Consumer Finance

Consequent upon the globalisation of Indian economy, a spurt increase in employment opportunities has been resulted. This has lead to steady increase in demand of durable consumer goods such as electronic and automobile goods. Consumers can now easily purchase the goods by way of consumer finance.

Strategic Financial Management

Basically consumer finance is concerned with providing short term/medium term loans to finance purchase of goods or services for personal use by consumers.

Consumer Finance is provided by Non-Banking Financial Companies (NBFCs) which are governed by RBI's regulations and other banking regulations.

5. Housing Finance

With the globalisation of economy level of housing sector activity has also increased. Main purpose is to cover loans to promoters as well as to users. Equated monthly installments (EMI) are an important concept in Housing Finance.

6. Asset Restructuring/Mutual Fund Management Company

These types of companies make investment decisions according to the investment policy indicated in the mutual funds scheme.

7. Depository Services

Depository Services may be defined as an organisation where the securities of a shareholder are held in the form of electronic accounts, in the same way as a bank holds money.

There are only two depositories in India:

- National Securities Depository Limited (NSDL): It was registered by SEBI on June 7, 1996 as India's first depository to facilitate trading and settlement of securities in the dematerialized form.
- Central Depository Service (India) limited (CSDL): It commenced its operations in February 1999. It was promoted by Stock Exchange, Mumbai in association with Bank of Baroda, Bank of India, State Bank of India and HDFC Bank.

8. Debit Cards

Although debit cards appear like credit cards but they operate like cash or personal cheques. The main difference between credit card and debit card is that, while credit card means to "pay later", a debit card means to "pay now". The money is instantly deducted from the user's account on the use of debit card.

9. Online Share Trading

Online Share Trading is basically Internet based trading and services. By using internet trading, any client sitting anywhere in the country would be able to trade through brokers' Internet Trading System. Online trading offers many advantages. NSE became the first exchange to grant approval to its members for providing Internet based trading services.

Question 1

Write a brief note about the meaning and regulations of NBFCs in India.

Answer

Meaning of NBFC's: An NBFC is a company or an institution basically engaged in acceptance of deposits under different schemes and to invest these monies in any manner. NBFC may be registered as a Company under Companies Act, 1956, or may be other form of organization. The Reserve Bank of India Act defines an NBFC as (1) a financial institution which is a company. (ii) a non-banking institution which is a company having its principal business the receiving of deposits under any scheme or lending in any manner (iii) such other non-banking institution as the RBI may specify with the approval of Central Government. Non-banking financial companies, normally, provides supplementary finance to the corporate sector. For the purpose of growing economy the role of NBFC's is important. The finance and related services is the major activity of NBFC's.

Regulation of NBFCs – RBI Act

The RBI Act regulates different types of NBFCs under the provisions of Chapter III – B & Chapter C.

Silent features of Chapter III – B

The two compulsory prerequisites as per Chapter III- B are

- (a) The NBFC should obtain a certificate of registration.
- (b) It must have NOF (Net Operating Funds) of Rs. 200 lacs.

These two requirements are cumulative.

Computation of NOF (Net Operating Funds) will be as follows

NOF is defined in the Section 45, I-A of the Act. The basis of computation is the latest Balance Sheet of the Company. Following items are considered for NOF.

- Paid up equity capital and free reserves.
- Accumulated losses, deferred revenues expenditure and intangible assets.
- Investment in shares of subsidiaries, companies in the same group and other NBFCs.
- Book value of Debentures, bonds made in subsidiaries or companies in the same group.
- Deposit with subsidiaries and companies in the same group.

Strategic Financial Management

The calculation of NOF is

$$X = 1 + 2$$

$$Y = 3 + 4 + 5.$$

If 10% of Y exceeds the X then excess to be find out.

The NOF of the NBFC will be X - the excess amount.

Procedure for obtaining registration

Application must be in the form prescribed by RBI and should be submitted to the Regional Office of the RBI.

Processing of application by RBI

RBI ensures capacity of the NBFC to meet the creditors claim in full, general character of the management and the capital structure. The activity of NBFC shall not be prejudicial to the operation and consolidation of the financial sector and also shall not be prejudicial to the public interest.

Cancellation of registration

Registration can be cancelled under section 44IA (6) wherein certain conditions are prescribed under the section such as

- § Non-compliance of directions issued by the RBI.
- § Fails to maintain accounts in accordance with any law or order issued by RBI.
- § Failed to submit or offer for inspection its books of accounts or other relevant documents when demanded by RBI.
- § Failed to comply with any conditions specified by RBI while granting certificate of registration.

Procedure for cancellation of registration

NBFC should be given a reasonable opportunity of being heard. NBFC must generally be given an opportunity by RBI for taking necessary steps to comply with the conditions, except in cases where RBI is of the opinion that the delay in canceling the certificate of registration shall be prejudicial to public interest or to the interest of the depositors of the NBFC.

Appellate Remedy

The NBFC can prefer and appeal to Central Government within 30 days from the date on which the cancellation order was communicated to it. If no appeal has been prescribed then the decision of RBI shall be final.

Question 2*What is Credit rating?***Answer**

Credit rating: Credit rating is a symbolic indication of the current opinion regarding the relative capability of a corporate entity to service its debt obligations in time with reference to the instrument being rated. It enables the investor to differentiate between instruments on the basis of their underlying credit quality. To facilitate simple and easy understanding, credit rating is expressed in alphabetical or alphanumerical symbols.

Credit rating aims to (i) provide superior information to the investors at a low cost; (ii) provide a sound basis for proper risk-return structure; (iii) subject borrowers to a healthy discipline and (iv) assist in the framing of public policy guidelines on institutional investment. Thus, credit rating financial services represent an exercise in faith building for the development of a healthy financial system. In India the rating coverage is of fairly recent origin, beginning 1988 when the first rating agency CRISIL was established. At present there are few other rating agencies like:

- (i) Credit Rating Information Services of India Ltd. (CRISIL).
- (ii) Investment Information and Credit Rating Agency of India (ICRA).
- (iii) Credit Analysis and Research Limited (CARE).
- (iv) Duff & Phelps Credit Rating India Pvt. Ltd. (DCR I)
- (v) ONICRA Credit Rating Agency of India Ltd.

Question 3

A Ltd. has a total sales of Rs. 3.2 crores and its average collection period is 90 days. The past experience indicates that bad-debt losses are 1.5% on Sales. The expenditure incurred by the firm in administering its receivable collection efforts are Rs. 5,00,000. A factor is prepared to buy the firm's receivables by charging 2% Commission. The factor will pay advance on receivables to the firm at an interest rate of 18% p.a. after withholding 10% as reserve.

Calculate the effective cost of factoring to the Firm.

Answer

	Rs.
Average level of Receivables = $3,20,00,000 \times 90/360$	80,00,000
Factoring commission = $80,00,000 \times 2/100$	1,60,000

Strategic Financial Management

Factoring reserve = $80,00,000 \times 10/100$ 8,00,000

Amount available for advance =

Rs. $80,00,000 - (1,60,000 + 8,00,000)$ 70,40,000

Factor will deduct his interest @ 18%:-

Interest = $\frac{\text{Rs. } 70,40,000 \times 18 \times 90}{100 \times 360}$ = Rs. 3,16,800

\ Advance to be paid = Rs. 70,40,000 - Rs. 3,16,800 = Rs. 67,23,200

Annual Cost of Factoring to the Firm: Rs.

Factoring commission (Rs. $1,60,000 \times 360/90$) 6,40,000

Interest charges (Rs. $3,16,800 \times 360/90$) 12,67,200

Total 19,07,200

Firm's Savings on taking Factoring Service: Rs.

Cost of credit administration saved 5,00,000

Cost of Bad Debts (Rs. $3,20,00,000 \times 1.5/100$) avoided 4,80,000

Total 9,80,000

Net cost to the Firm (Rs. $19,07,200 - \text{Rs. } 9,80,000$) 9,27,200

Effective rate of interest to the firm = $\frac{\text{Rs. } 9,27,200 \times 100}{67,23,200}$ 13.79%

Note: The number of days in a year has been assumed to be 360 days.

Question 4

A company is considering engaging a factor, the following information is available:

- (i) The current average collection period for the Company's debtors is 80 days and $\frac{1}{2}\%$ of debtors default. The factor has agreed to pay money due after 60 days and will take the responsibility of any loss on account of bad debts.
- (ii) The annual charge for the factoring is 2% of turnover payable annually in arrears. Administration cost saving is likely to be Rs.1,00,000 per annum.
- (iii) Annual sales, all on credit, are Rs.1,00,00,000. Variable cost is 80% of sales price. The Company's cost of borrowing is 15% per annum. Assume the year is consisting of 365 days.

Should the Company enter into a factoring agreement?

Answer

The annual change in cash flows through entering into a factoring agreement is:

(Amount in Rs.)

Savings

Administration cost saved		1,00,000
Existing average debtors	21,91,781	
[Rs.1,00,00,000/365) x 80 days]		
Average New Debtors	16,43,836	
[(Rs.100,00,000/365) x 60 days]		
Reduction in debtors	5,47,945	
Cost there of @80%	4,38,356	
Add: Interest saving @15% P.A on.	Rs.4,38,356	65,753
Add: Bad Debts saved @.005 of	Rs.1,00,00,000	50,000
	Total	2,15,753
Less: Annual charges @2% of	Rs.1,00,00,000	2,00,000

Net annual benefits of factoring 15,753

Therefore, the factoring agreement is worthwhile and should be undertaken.

Question 5

MSN Ltd. has total sales of Rs.4.50 crores and its average collection period is 120 days. The past experience indicates that bad debt losses are 2 percent on sales. The expenditure incurred by the company in administering its receivable collection efforts are Rs.6,00,000. A Factor is prepared to buy the company's receivables by charging 2 percent commission. The factor will pay advance on receivables to the company at an interest rate of 18 percent per annum after withholding 10 percent as reserve.

You are required to calculate effective cost of factoring to the company.

Answer

	MSN Ltd.	
Average level of Receivables	$45000000 \times 120 / 360$	15000000
Factoring commission	$15000000 \times 2\%$	300000
Factoring Reserve	$15000000 \times 10\%$	1500000

Strategic Financial Management

Amount available for advance	$15000000 - (300000 + 1500000)$	13200000
Factor will deduct interest @ 18%		
Interest $(13200000 \times 18 \times 120) / 100 \times 360$		792000
Advance to be paid = Rs.13200000 – 792000		12408000
Annual cost of factoring to the firm:		
Factoring commission $(Rs.300000 \times 360 / 1320)$		900000
Factoring commission $(Rs.300000 \times 360 / 120)$		2376000
		3276000
Firms savings on taking factoring service:		
Cost of credit administration saved		600000
Cost of bad debts $(45000000 \times 2\%)$		900000
Total savings		1500000
Net cost to the firm = Rs.3276000 – 1500000 = Rs.1776000		
Effective rate of interest to the firm = $1776000 \times 100 / 12408000 = 14.31\%$		

Note: The number of days in a year is assumed to be 360 days.

EXERCISES

Question

The following financial information related to Norwason India Ltd.:

	2009	2008
	Rs. 000	Rs. 000
Sales (all on credit)	37,400	26,720
Cost of sales	<u>34,408</u>	<u>23,781</u>
Operating profit	2,992	2,939
Finance costs (interest payments)	<u>355</u>	<u>274</u>
Profit before taxation	<u>2,637</u>	<u>2,665</u>

	2009		2008	
	Rs. 000	Rs. 000	Rs. 000	Rs. 000
Non-current assets		13,632		12,750
Current assets				
Inventory	4,600		2,400	
Trade receivables	<u>4,600</u>		<u>2,200</u>	
	9,200		4,600	
Current liabilities				
Trade payables	4,750		2,000	
Overdraft	<u>3,225</u>		<u>1,600</u>	
	7,975		3,600	
Net current assets		<u>1,225</u>		<u>1,000</u>
		14,857		13,750
8% Bonds		<u>2,425</u>		<u>2,425</u>
		<u>12,432</u>		<u>11,325</u>
Capital and reserves				
Share capital		6,000		6,000
Reserves		<u>6,432</u>		<u>5,325</u>
		12,432		11,325

The average variable overdraft interest rate in each year was 5%. The 8% bonds are redeemable in ten years' time.

A factor has offered to take over the administration of trade receivables on a non-recourse basis for an annual fee of 3% of credit sales. The factor will maintain a trade receivables collection period of 30 days and Norwason India Ltd will save Rs.1,00,000 per year in administration costs and Rs. 3,50,000 per year in bad debts. A condition of the factoring agreement is that the factor would advance 80% of the face value of receivables at an annual interest rate of 7%.

Evaluate whether the proposal to factor trade receivables is financially acceptable.

(Answer: Net cost of factoring is 6,44,884 and hence factor's offer not recommended.)

MUTUAL FUNDS

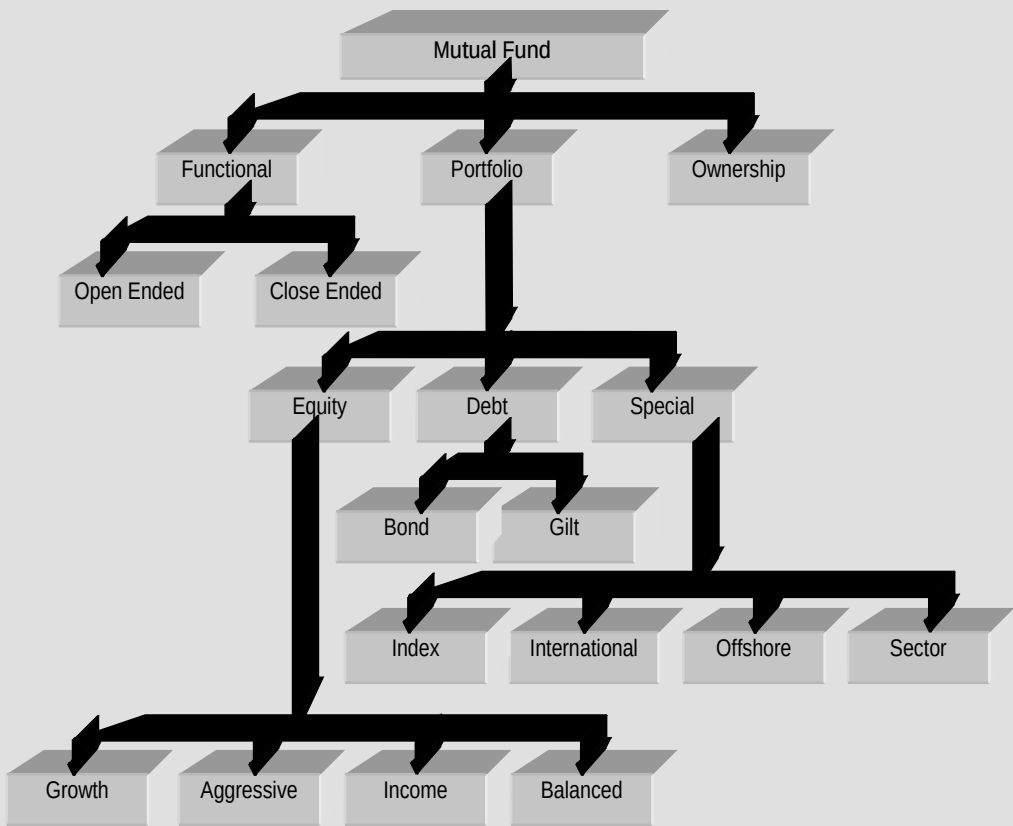
BASIC CONCEPTS

1. Introduction

Mutual Fund is a trust that pools the savings of a number of investors who share a common financial goal. Mutual Fund offers an opportunity to invest in a diversified professionally managed basket of securities at a relatively low cost.

2. Types of Mutual Funds

Mutual Funds can be classified on three bases like Functional, Portfolio and Ownership.



3. Advantages of Mutual Funds

- Professional Management,
- Diversification,
- Convenient Administration,
- Higher Returns,
- Low Cost Management,
- Liquidity,
- Transparency, and
- Highly Regulated.

4. Drawbacks of Mutual Funds

- No guarantee of returns,
- No guarantee of maximising of returns through diversification,
- Future cannot be predicted,
- Cost factor, and
- Unethical Practices

5. Evaluating Performance of Mutual Funds

As in Mutual Fund, an investor is a part of all its assets and liabilities, return is determined by inter-play of two elements Net Asset Value and Cost of Mutual Fund.

- (a) **Net Asset Value (NAV)** – It is the amount which a unit holder would receive if the mutual funds were wound up. There is a Valuation Rule for valuation of assets which depends on the nature of assets. The asset values obtained on the basis of this rule is further adjusted on account of additions (in form of dividend and interest accrued and other receivables) and deductions (in form of expenses accrued and other short-term and long-term liabilities).

Net Asset of the Scheme = Market Value of Investments + Receivables+ Other accrued income + Other Assets – Accrued Expenses – Other Payables – Other Liabilities

$$\text{NAV} = \frac{\text{Net Asset of Scheme}}{\text{Number of Units Outstanding}}$$

- (b) **Cost of Mutual Funds** – Broadly cost of Mutual Fund carries two components:

- (i) Initial Expenses – Attributing to establishing a scheme under a scheme.
- (ii) Ongoing Recurring Expenses – Mainly consists of Cost of employing experts, Administrative Costs and Advertisement Cost.

6. Computation of Returns

Mainly investors derive three types of income from owning mutual fund units:

- Cash Dividends,
- Capital Gain Disbursements, and
- Changes in the Fund's NAV.

The formula for computing annual return is as follows:

$$= \frac{D_1 + CG_1 + (NAV_1 - NAV_0)}{NAV_0} \times 100$$

Where,

D_1 = Dividend

CG_1 = Realised Capital Gain

$NAV_1 - NAV_0$ = Unrealised Capital Gain

NAV_0 = Base NAV

7. Criteria for Evaluating the Performance

Following three ratios are used to evaluate the performance of mutual funds:

- (a) Sharpe Ratio – This ratio measures the return earned in excess of the risk-free rate (normally Treasury Instruments) on a portfolio to the portfolio's total risk as measured by the Standard Deviation in its return and over the measurement period. The formula to calculate the ratio is as follows:

$$S = \frac{\text{Return Portfolio} - \text{Return of Risk Free Investment}}{\text{Standard Deviation of Portfolio}}$$

- (b) Treynor Ratio – This ratio is similar to Sharpe Ratio however, with a difference that it uses Beta instead of Standard Deviation. The formula to calculate this ratio is as follows:

$$T = \frac{\text{Return of Portfolio} - \text{Return of Risk Free Investment}}{\text{Beta of Portfolio}}$$

- (c) **Jensen's Alpha** – This is basically the difference between a fund's actual return and those that could have been made on a benchmark portfolio with the same risk i.e. beta. It measures the ability of active management to increase return above those that are purely a reward for bearing a market risk.

$$\text{Alpha} = \text{Return of Portfolio} - \text{Expected Return}$$

8. Factors Influencing the Selection of Mutual Funds

- Past Performance
- Timing
- Size of Fund
- Age of Fund
- Largest Holding
- Fund Manager
- Expense Ratio
- PE Ratio
- Portfolio Turnover.

9. Money Market Mutual Funds (MMMFs)

These types of funds were introduced in 1992 with the objective of enabling to gain from money market instruments since it is practically impossible for individuals to invest in instruments like Commercial Papers (CPs), Certificate of Deposits (CDs) and Treasury Bills (TBs) as they require huge investments.

10. Exchange Traded Funds (ETFs)

It is a hybrid product that combines the features of an index fund. These funds are listed on the stock exchanges and their prices are linked to the underlying index.

ETFs can be bought and sold like any other stock on an exchange and prices are normally expected to be closer to the NAV at the end of the day. There is no paper work involved for investing in an ETF. These can be bought like any other stock by just placing an order with a broker.

Question 1

Write short notes on the role of Mutual Funds in the Financial Market.

Answer

Role of Mutual Funds in the Financial Market

Mutual funds have opened new vistas to investors and imparted much needed liquidity to the system. In this process, they have challenged the hitherto dominant role of the commercial banks in the financial market and national economy.

In 1997, the share of mutual funds in house-hold financial assets was over 5% in USA, 8% in Germany, 3% in Japan, 3% in Italy and about 5% in India. In India, there has been a steady increase in the share of mutual funds in house-hold savings since 1988-89, i.e. after the entry of public sector mutual funds. The most significant growth during 1980-81 to 1992-93 was in respect of UTI.

According to Centre for Monitoring Indian Economy, "Mutual Funds" cornered 12% of the total market capitalisation, the share of the UTI being 9.4% of the total market capitalisation of Indian stock markets.

Question 2

Explain how to establish a Mutual Fund.

Answer

Establishment of a Mutual Fund: A mutual fund is required to be registered with the Securities and Exchange Board of India (SEBI) before it can collect funds from the public. All mutual funds are governed by the same set of regulations and are subject to monitoring and inspections by the SEBI. The Mutual Fund has to be established through the medium of a sponsor. A sponsor means any body corporate who, acting alone or in combination with another body corporate, establishes a mutual fund after completing the formalities prescribed in the SEBI's Mutual Fund Regulations.

The sponsor should have a sound track record and general reputation of fairness and integrity in all his business transactions.

The Mutual Fund has to be established as either a trustee company or a Trust, under the Indian Trust Act and the instrument of trust shall be in the form of a deed. The deed shall be executed by the sponsor in favour of the trustees named in the instrument of trust. The trust deed shall be duly registered under the provisions of the Indian Registration Act, 1908. The trust deed shall contain clauses specified in the Third Schedule of the Regulations.

An Asset Management Company, who holds an approval from SEBI, is to be appointed to manage the affairs of the Mutual Fund and it should operate the schemes of such fund.

Strategic Financial Management

The Asset Management Company is set up as a limited liability company, with a minimum net worth of Rs. 10 crores.

The sponsor should contribute at least 40% to the networth of the Asset Management Company. The Trustee should hold the property of the Mutual Fund in trust for the benefit of the unit holders.

SEBI regulations require that at least two-thirds of the directors of the Trustee Company or board of trustees must be independent, that is, they should not be associated with the sponsors. Also, 50 per cent of the directors of AMC must be independent.

Question 3

Explain briefly about net asset value (NAV) of a Mutual Fund Scheme.

Answer

Net Asset Value (NAV) is the total asset value (net of expenses) per unit of the fund calculated by the Asset Management Company (AMC) at the end of every business day. Net Asset Value on a particular date reflects the realizable value that the investor will get for each unit that he is holding if the scheme is liquidated on that date.

The performance of a particular scheme of a mutual fund is denoted by Net Asset Value (NAV). Net Asset Value may also be defined as the value at which new investors may apply to a mutual fund for joining a particular scheme.

It is the value of net assets of the fund. The investors' subscription is treated as the capital in the balance sheet of the fund, and the investments on their behalf are treated as assets. The NAV is calculated for every scheme of the MF individually. The value of portfolio is the aggregate value of different investments.

$$\text{The Net Asset Value (NAV)} = \frac{\text{Net Assets of the scheme}}{\text{Number of units outstanding}}$$

Net Assets of the scheme will normally be:

Market value of investments + Receivables + Accrued Income + Other Assets – Accrued Expenses – Payables – Other Liabilities

Since investments by a Mutual Fund are marked to market, the value of the investments for computing NAV will be at market value.

NAV of MF schemes are published on a daily basis in Newspapers and electronic media and play an important part in investors' decisions to enter or to exit. Analyst use the NAV to determine the yield on the schemes.

The Securities and Exchange Board of India (SEBI) has notified certain valuation norms calculating net asset value of Mutual fund schemes separately for traded and non-traded schemes.

Question 4

What are the investors' rights & obligations under the Mutual Fund Regulations? Explain different methods for evaluating the performance of Mutual Fund.

Answer

Investors' Rights and Obligations under the Mutual Fund Regulations

Important aspect of the mutual fund regulations and operations is the investors' protection and disclosure norms. It serves the very purpose of mutual fund guidelines. Due to these norms it is very necessary for the investor to remain vigilant. Investor should continuously evaluate the performance of mutual fund.

Following are the steps taken for improvement and compliance of standards of mutual fund:

1. All mutual funds should disclose full portfolio of their schemes in the annual report within one month of the close of each financial year. Mutual fund should either send it to each unit holder or publish it by way of an advertisement in one English daily and one in regional language.
2. The Asset Management Company must prepare a compliance manual and design internal audit systems including audit systems before the launch of any schemes. The trustees are also required to constitute an audit committee of the trustees which will review the internal audit systems and the recommendation of the internal and statutory audit reports and ensure their rectification.
3. The AMC shall constitute an in-house valuation committee consisting of senior executives including personnel from accounts, fund management and compliance departments. The committee would on a regular basis review the system practice of valuation of securities.
4. The trustees shall review all transactions of the mutual fund with the associates on a regular basis.

Investors' Rights

1. Unit holder has proportionate right in the beneficial ownership of the schemes assets as well as any dividend or income declared under the scheme.
2. Receive dividend warrant within 42 days.
3. AMC can be terminated by 75% of the unit holders.

Strategic Financial Management

4. Right to inspect major documents i.e. material contracts, Memorandum of Association and Articles of Association (M.A. & A.A) of the AMC, Offer document etc.
5. 75% of the unit holders have the right to approve any changes in the close ended scheme.
6. Every unit holder have right to receive copy of the annual statement.

Legal Limitations to Investors' Rights

1. Unit holders cannot sue the trust but they can initiate proceedings against the trustees, if they feel that they are being cheated.
2. Except in certain circumstances AMC cannot assure a specified level of return to the investors. AMC cannot be sued to make good any shortfall in such schemes.

Investors' Obligations

1. An investor should carefully study the risk factors and other information provided in the offer document. Failure to study will not entitle him for any rights thereafter.
2. It is the responsibility of the investor to monitor his schemes by studying the reports and other financial statements of the funds.

Methods for Evaluating The Performance

1. Sharpe Ratio

The excess return earned over the risk free return on portfolio to the portfolio's total risk measured by the standard deviation. This formula uses the volatility of portfolio return.

$$S = \frac{\text{Return of portfolio} - \text{Return of risk free investment}}{\text{Standard Deviation of Portfolio}}$$

2. Treynor Ratio

This ratio is similar to the Sharpe Ratio except it uses Beta of portfolio instead of standard deviation.

$$T = \frac{\text{Return of portfolio} - \text{Return of risk free investment}}{\text{Beta of Portfolio}}$$

3. Jensen's Alpha

The comparison of actual return of the fund with the benchmark portfolio of the same risk. Normally, for the comparison of portfolios of mutual funds this ratio is applied and compared with market return. It shows the comparative risk and reward from the said portfolio. Alpha is the excess of actual return compared with expected return.

Question 5

What are the advantages of investing in Mutual Funds?

Answer

The advantages of investing in a Mutual Fund are:

1. **Professional Management:** Investors avail the services of experienced and skilled professionals who are backed by a dedicated investment research team which analyses the performance and prospects of companies and selects suitable investments to achieve the objectives of the scheme.
2. **Diversification:** Mutual Funds invest in a number of companies across a broad cross-section of industries and sectors. Investors achieve this diversification through a Mutual Fund with far less money and risk than one can do on his own.
3. **Convenient Administration:** Investing in a Mutual Fund reduces paper work and helps investors to avoid many problems such as bad deliveries, delayed payments and unnecessary follow up with brokers and companies.
4. **Return Potential:** Over a medium to long term, Mutual Fund has the potential to provide a higher return as they invest in a diversified basket of selected securities.
5. **Low Costs:** Mutual Funds are a relatively less expensive way to invest compared to directly investing in the capital markets because the benefits of scale in brokerage, custodial and other fees translate into lower costs for investors.
6. **Liquidity:** In open ended schemes investors can get their money back promptly at net asset value related prices from the Mutual Fund itself. With close-ended schemes, investors can sell their units on a stock exchange at the prevailing market price or avail of the facility of direct repurchase at NAV related prices which some close ended and interval schemes offer periodically.
7. **Transparency:** Investors get regular information on the value of their investment in addition to disclosure on the specific investments made by scheme, the proportion invested in each class of assets and the fund manager's investment strategy and outlook.

Question 6

- (i) *Who can be appointed as Asset Management Company (AMC)?*
- (ii) *Write the conditions to be fulfilled by an AMC.*
- (iii) *What are the obligations of AMC?*

Strategic Financial Management

Answer

- (i) **Asset Management Company (AMC):** A company formed and registered under Companies Act 1956 and which has obtained the approval of SEBI to function as an asset management company may be appointed by the sponsorer of the mutual fund as AMC.
- (ii) **Conditions to be fulfilled by an AMC**
 - (1) Any director of the asset management company shall not hold the place of a director in another asset management company unless such person is independent director referred to in clause (d) of sub-regulation (1) of regulation 21 of the Regulations and the approval of the Board of asset management company of which such person is a director, has been obtained.
 - (2) The asset management company shall forthwith inform SEBI of any material change in the information or particulars previously furnished which have a bearing on the approval granted by SEBI.
 - (a) No appointment of a director of an asset management company shall be made without the prior approval of the trustees.
 - (b) The asset management company undertakes to comply with SEBI (Mutual Funds) Regulations, 1996.
 - (c) No change in controlling interest of the asset management company shall be made unless prior approval of the trustees and SEBI is obtained.
 - (i) A written communication about the proposed change is sent to each unit holder and an advertisement is given in one English Daily newspaper having nation wide circulation and in a newspaper published in the language of the region where the head office of the mutual fund is situated.
 - (ii) The unit holders are given an option to exit at the prevailing Net Asset Value without any exit load.
 - (iii) The asset management company shall furnish such information and documents to the trustees as and when required by the trustees.
- (iii) **Obligations of the AMC**
 - (1) The AMC shall manage the affairs of the mutual funds and operate the schemes of such fund.

- (2) The AMC shall take all reasonable steps and exercise due diligence to ensure that the investment of the mutual funds pertaining to any scheme is not contrary to the provisions of SEBI Regulations and the trust deed of the mutual fund.

Question 7

A mutual fund that had a net asset value of Rs. 20 at the beginning of month - made income and capital gain distribution of Re. 0.0375 and Re. 0.03 per share respectively during the month, and then ended the month with a net asset value of Rs. 20.06. Calculate monthly return.

Answer

Calculation of Monthly Return on the Mutual Funds

$$r = \frac{(NAV_t - NAV_{t-1}) + I_t + G_t}{NAV_{t-1}}$$

Where,

r = Return on the mutual fund

NAV_t = Net assets value at time period t

NAV_{t-1} = Net assets value at time period $t - 1$

I_t = Income at time period t

G_t = Capital gain distribution at time period t

$$r = \frac{(Rs. 20.06 - Rs. 20.00) + (Re. 0.0375 + Re. 0.03)}{20}$$

$$= \frac{0.06 + 0.0675}{20}$$

$$= \frac{0.1275}{20} = 0.006375$$

Or, $r = 0.6375\%$ p.m.

Or $= 7.65\%$ p.a.

Question 8

Mr. A can earn a return of 16 per cent by investing in equity shares on his own. Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.5 per cent and annual recurring expenses are 1.5 per cent. How much should the mutual fund earn to provide Mr. A return of 16 per cent?

Strategic Financial Management

Answer

Personal earnings of Mr. A = R_1

Mutual Fund earnings = R_2

$$\begin{aligned}
 R_2 &= \frac{1}{1 - \text{Initial expenses}(\%)} R_1 + \text{Recurring expenses}(\%) \\
 &= \frac{1}{1 - 0.055} \times 16\% + 1.5\% \\
 &= 18.43\%
 \end{aligned}$$

Mutual Fund earnings = 18.43%

Question 9

A has invested in three Mutual Fund Schemes as per details below:

	MF A	MF B	MF C
Date of investment	01.12.2009	01.01.2010	01.03.2010
Amount of investment	Rs. 50,000	Rs. 1,00,000	Rs. 50,000
Net Asset Value (NAV) at entry date	Rs. 10.50	Rs. 10	Rs. 10
Dividend received upto 31.03.2004	Rs. 950	Rs. 1,500	Nil
NAV as at 31.03.2004	Rs. 10.40	Rs. 10.10	Rs. 9.80

Required:

What is the effective yield on per annum basis in respect of each of the three schemes to Mr. A upto 31.03.2010?

Answer

Scheme	Investment	Unit Nos.	Unit NAV 31.3.2010	Total NAV 31.3.2010
	Rs.		Rs.	Rs.
MFA	50,000	4761.905	10.40	49,523.812
MFB	1,00,000	10,000	10.10	1,01,000
MFC	50,000	5,000	9.80	49,000

Scheme	NAV (+) / (-) Rs.	Dividend Received Rs.	Total Yield Rs.	Number of days	Effective Yield (% P.A.)
MFA	(-)476.188	950	473.812	122	2.835%
MFB	(+)1,000	1,500	2,500	91	10.027%
MFC	(-)1,000	Nil	(-)1,000	31	(-)24%

Question 10

Sun Moon Mutual Fund (Approved Mutual Fund) sponsored open-ended equity oriented scheme "Chanakya Opportunity Fund". There were three plans viz. 'A' – Dividend Re-investment Plan, 'B' – Bonus Plan & 'C' – Growth Plan.

At the time of Initial Public Offer on 1.4.1999, Mr. Anand, Mr. Bacchan & Mrs. Charu, three investors invested Rs. 1,00,000 each & chosen 'B', 'C' & 'A' Plan respectively.

The History of the Fund is as follows:

Date	Dividend %	Bonus Ratio	Net Asset Value per Unit (F.V. Rs. 10)		
			Plan A	Plan B	Plan C
28.07.2003	20		30.70	31.40	33.42
31.03.2004	70	5 : 4	58.42	31.05	70.05
31.10.2007	40		42.18	25.02	56.15
15.03.2008	25		46.45	29.10	64.28
31.03.2008		1 : 3	42.18	20.05	60.12
24.03.2009	40	1 : 4	48.10	19.95	72.40
31.07.2009			53.75	22.98	82.07

On 31st July all three investors redeemed all the balance units.

Calculate annual rate of return to each of the investors.

Consider:

- 1. Long-term Capital Gain is exempt from Income tax.*
- 2. Short-term Capital Gain is subject to 10% Income tax.*
- 3. Security Transaction Tax 0.2 per cent only on sale/redemption of units.*
- 4. Ignore Education Cess*

Strategic Financial Management

Answer

(a) Mrs. Charu Plan A Dividend Reinvestment

(Amount in Rs.)

Date	Investment	Rate	Units	Balance
01.04.1999	1,00,000.00	10.00	10,000.00	10,000.00
28.07.2003	20,000.00	30.70	651.47	10,651.47
31.03.2004	74,560.29	58.42	1,276.28	11,927.75
30.10.2007	47,711.00	42.18	1,131.13	13,058.88
15.03.2008	32,647.20	46.45	702.85	13,761.73
31.03.2008	N.A.	N.A.	N.A.	13,761.73
24.03.2009	55,046.92	48.10	1,144.43	14,906.16

Redemption value 14,906.16 × 53.75 8,01,206.10

Less: Security Transaction Tax (S.T.T) is .2% 1,602.41

Net amount received 7,99,603.69

Less: Short term capital gain tax @ 10%

1,144.43 (53.64 – 48.10) 6,340

i.e. 53.75 – S.T.T. .2% 634

Net of tax 7,98,969.69

Less: Investment 1,00,000.00

6,98,969.69

Annual average return (%) $\frac{6,98,969}{1,00,000} \times \frac{12}{124} \times 100 = 67.64$

Mr. Anand Plan B – Bonus

(Amount in Rs.)

Date	Units	Balance	NAV per unit
01.04.1999	10,000	10,000	10
31.03.2004	12,500	22,500	31.05
31.03.2008	7,500	30,000	20.05
24.03.2009	7,500	37,500	19.95

Redemption value 37,500 ´ 22.98	8,61,750.00
Less: Security Transaction Tax (S.T.T) is .2%	<u>1,723.50</u>
Net amount received	8,60,026.50
Less: Short term capital gain tax @ 10%	
7,500 ´ (22.93 – 19.95)	22,350
i.e. 22.98 – S.T.T. .2%	<u>2,235.00</u>
Net of tax	8,57,791.50
Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,57,791.50</u>
Annual average return (%)	$\frac{7,57,791}{1,00,000} \times \frac{12}{124} \times 100 = 73.33$

Mr. Bacchan Plan C – Growth*(Amount in Rs.)*

Redemption value 10,000 ´ 82.07	8,20,700.00
Less: Security Transaction Tax (S.T.T) is .2%	<u>1,641.40</u>
Net amount received	8,19,058.60
Less: Short term capital gain tax @ 10%	<u>0.00</u>
Net of tax	8,19,058.60
Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,19,058.60</u>
Annual average return (%)	$\frac{7,19,058}{1,00,000} \times \frac{12}{124} \times 100 = 69.59$

Question 11

A Mutual Fund having 300 units has shown its NAV of Rs.8.75 and Rs.9.45 at the beginning and at the end of the year respectively. The Mutual Fund has given two options:

- (i) Pay Rs.0.75 per unit as dividend and Rs.0.60 per unit as a capital gain, or
- (ii) These distributions are to be reinvested at an average NAV of Rs.8.65 per unit.

What difference it would make in terms of return available and which option is preferable?

Strategic Financial Management

Answer

(i) Returns for the year

(All changes on a Per -Unit Basis)

Change in Price: Rs.9.45 – Rs.8.75 = Re.0.70

Dividends received: Re. 0.75

Capital gains distribution Re. 0.60Total reward Rs. 2.05Holding period reward: $\frac{\text{Rs. 2.05}}{\text{Rs. 8.75}} = 23.43\%$

(ii) When all dividends and capital gains distributions are re-invested into additional units of the fund @ (Rs. 8.65/unit)

Dividend + Capital Gains per unit

 $= \text{Re. 0.75} + \text{Re 0.60} = \text{Rs. 1.35}$ Total received from 300 units $= \text{Rs. 1.35} \times 300 = \text{Rs. 405/-}$

Additional Units Acquired

 $= \text{Rs. 405} / \text{Rs. 8.65} = 46.82 \text{ Units.}$ Total No. of Units_ $= 300 \text{ units} + 46.82 \text{ units}$ $= 346.82 \text{ units.}$

Value of 346.82 units held at the end of the year

 $= 346.82 \text{ units} \times \text{Rs. 9.45} = \text{Rs. 3277.45}$

Price Paid for 300 Units at the beginning of the year

 $= 300 \text{ units} \times \text{Rs. 8.75} = \text{Rs. 2,625.00}$

Holding Period Reward

Rs. (3277.45 – 2625.00) $= \text{Rs. 652.45}$ %age of Holding Period Reward $\frac{\text{Rs. 652.45}}{\text{Rs. 2625.00}} = 24.85\%$

Conclusion: Since the holding period reward is more in terms of percentage in option-two i.e., reinvestment of distributions at an average NAV of Rs.8.65 per unit, this option is preferable.

Question 12

Mr. X on 1.7.2007, during the initial offer of some Mutual Fund invested in 10,000 units having face value of Rs.10 for each unit. On 31.3.2008, the dividend operated by the M.F. was 10% and Mr. X found that his annualized yield was 153.33%. On 31.12.2009, 20% dividend was given. On 31.3.2010, Mr. X redeemed all his balance of 11,296.11 units when his annualized yield was 73.52%. What are the NAVs as on 31.3.2008, 31.12.2009 and 31.3.2010?

Answer

$$\begin{aligned}
 \text{Yield for 9 months} &= (153.33 \times 9/12) = 115\% \\
 \text{Amount receivable as on 31.03.2008} &= 1,00,000/- + (1,00,000 \times 115\%) \\
 &= \text{Rs.}2,15,000/- \\
 \text{Therefore, NAV as on 31.03.2008} &= (2,15,000 - 10,000)/10,000 = \text{Rs.}20.50 \\
 \text{Therefore, units as on 31.03.2008} &= 10487.80 \text{ i.e., } (2,15,000/20.50) \\
 \text{Dividend as on 31.03.2009} &= 10,487.80 \times 10 \times 0.2 = \text{Rs.}20,975.60 \\
 \text{Therefore, NAV as on 31.03.2009} &= 20,795.6/(11,296.11 - 10,487.80) \\
 &= \text{Rs.}25.95 \\
 \text{NAV as on 31.03.2010} &= 1,00,000 (1 + 0.7352 \times 33/12)/11296.11 \\
 &= \text{Rs.}26.75
 \end{aligned}$$

EXERCISES

Question 1

Consider the following information about the return on Classic Mutual Fund, the market return and the T-bill returns:

Year	Classic Mutual Fund	Market Index	T-bills
1995	17.1	10.8	5.4
1996	-14.6	-8.5	6.7
1997	1.7	3.5	6.5
1998	8.0	14.1	4.3
1999	11.5	18.7	4.1
2000	-5.8	-14.5	7.0
2001	-15.6	-26.0	7.9

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2002	38.5	36.9	5.8
2003	33.2	23.6	5.0
2004	-7.0	-7.2	5.3
2005	2.9	7.4	6.2
2006	27.4	18.2	10.0
2007	23.0	31.5	11.4
2008	-0.6	-4.9	14.1
2009	21.4	20.4	10.7

The following additional information is available regarding the comparative performance of five mutual funds:

	<i>Return (%)</i>	<i>Standard Deviation (%)</i>	<i>Beta</i>	
Alpha	1.95	20.03	0.983	0.819
Beta	11.57	18.33	0.971	0.881
Gama	8.41	22.92	1.169	0.816
Rho	9.05	24.04	1.226	0.816
Theta	7.86	15.46	0.666	0.582

From the above information, calculate all the inputs required for determining the Sharpe's Ratio, Treynor's ratio and Jensen's ratio.

(Answer: Sharpe's measure index- Classic Mutual Fund= 0.125 and Market Index= 0.053, Treynor's measure- Classic Mutual Fund = 2.32 and Market Index- $T_m = 8.267 - 7.360/1.00 = 0.907$ and Jensen's performance measure- 1.248)

Question 2

Templan Mutual Fund had Rs. 10,00,00,000 as on Jan. 1, 2009. The fund had issued 1,00,00,000 units of Rs.10 each. It made the following investments:

	<i>Rs.</i>
5,00,000 Equity Shares of Rs.100 each @ Rs.160/-	8,00,00,000
8% Central Government Securities	80,00,000
9% Debentures (unlisted)	50,00,000
10% Debentures (Listed)	<u>50,00,000</u>
Total	<u>9,80,00,000</u>

During the year, dividends of Rs.120,00,000 were received on equity shares. Interest on all types of debt securities was received as and when due. At the end of the year, the equity shares and 10% debentures are quoted at Rs. 175 and Rs. 90 respectively. Find out the NPV per unit given that operating expenses incurred during the year amounted to Rs.50,00,000. Also find out the NPV, if the mutual fund had distributed a dividend of Rs.0.80 per unit during the year to the unit holders.

Assume that no load was charged.

(Answer: Rs.10.759)

MONEY MARKET OPERATIONS

BASIC CONCEPTS

1. Introduction

The financial system of any country is a conglomeration of sub-markets, viz money, capital and foreign exchange market. The presence of an active and vibrant money market is an essential pre-requisite for the growth and development of an economy. The major players in the money market are the Reserve Bank of India and financial institutions like the UTI, GIC and LIC.

2. Distinct Features of Money Market

- Though it is one market but it is a collection /network of various inter-related sub-markets such as call money, notice money, repos, etc.
- Normally activities of money market tend to concentrate in some centres for e.g. London and New York which have become World Financial Centres.
- In true money market, price differentials for assets of similar type tend to be eliminated by interplay of demand and supply.
- There are constant endeavours for introducing new instruments/innovative dealing techniques.

3. Pre-Conditions for an Efficient Money Market

Development of money market into a sophisticated market depends upon certain conditions. They are:

- Institutional development.
- Banks and other players in the market have to be licensed and effectively supervised by regulators.
- Demand and supply must exist for idle cash.
- Electronic Fund Transfer (EFT), Depository System, Delivery versus Payment (DVP), High Value Inter-bank Payment System, etc. are pre-requisites.

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- Market should have varied instruments with distinctive maturity and risk profiles to meet the varied aptitude of the players in the market.
- Govt. /Central Bank should intervene to moderate liquidity profile.
- Market should be integrated with the rest of the markets in the financial system to ensure perfect equilibrium.

4. Rigidities in the Indian Money Market

Indian money market suffers from following rigidities:

- Markets not integrated,
- Highly volatile,
- Interest rates not properly aligned,
- Restricted players,
- Influence used by supply sources,
- Limited Instruments,
- Reserve requirements, and
- Lack of Transparency.

5. Distinction between Capital and Money Market

Following are some of the major distinctions between money market and capital market:

Basis	Capital Market	Money Market
1. Classification	Primary Market and Secondary Market	No such classification
2. Requirement	Deals with funds for long-term requirement	Deals with supply of short-term requirements
3. Number of Instruments	Only shares and debentures	Many like CPs, T-Bills, etc
4. Players	General investors, brokers, Merchant Bankers, Registrar to the Issue, Underwriters, Corporate investors, FIIs and bankers.	Bankers, RBI and Government.

6. Vaghul Group Report

The RBI appointed a working group under the chairmanship of Shri N. Vaghul in September 1986. The recommendations of the working group laid foundation for systematic action by RBI for the development of the Indian money market.

The Committee outlined the conceptual framework in the form of broad objectives of the money market which are as follows:

- Money market should provide an equilibrating mechanism for evening out short-term surpluses and deficits.
- It should provide a focal point for influencing liquidity in the economy.
- It should provide reasonable access to users of short-term money to meet their requirements at a realistic price.

7. Institutions

The important institutions operating in money market are:

- **RBI** – Takes requisite measures to implement monetary policy of the country.
- **Scheduled Commercial Banks** – They form the most important borrower/supplier of short term funds.
- **Discount and Finance House of India (DFHI)** – Set up by RBI jointly with public sector banks and all-India financial institutions to deal in short-term money market instruments.

8. Instruments

The traditional short-term money market instruments consist mainly of call money and notice money with limited players, treasury and commercial bills. The new instruments were introduced giving a wider choice to short-term holders of money to reap yield on funds even for a day or to earn little more by parking funds by instruments for a few days more or until such time they need it for lending at a higher rate.

The instruments used by various players to borrow and lend money are as follows:

- **Call/Notice Money:** Call money refers to that transaction which is received or delivered by the participants in the call money market and where the funds are returnable next day. Notice money on the other hand is a transaction where the participants receive or deliver for more than two days but generally for a maximum of fourteen days.

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- **Inter-bank term money:** the DFIs are permitted to borrow from the market for a period of 3 months upto a period of not more than 6 months within the limits stipulated by RBI.
- **Inter-bank participation certificates (IBPC):** It is a short-term money market instrument by which the banks can raise money or deploy short term surplus.
- **Inter corporate deposits:** They are short-term borrowing and lending of funds amongst the corporations.
- **Treasury Bills:** They are short-term instruments issued by RBI on behalf of the Government of India to tide over short-term liquidity shortfalls.
- **Commercial Bills:** It is a written instrument containing unconditional order signed by the maker, directing to pay a certain amount of money only to a particular person, or to the bearer of the instrument.
- **Certificate and Deposits (CDs):** They are money market instruments in form of usance Promissory Notes issued at a discount and are negotiable in character. There is a lock-in-period of 15 days, after which they can be sold.
- **Commercial Papers:** They are debt instruments for short-term borrowings that enable highly-rated corporate borrowers to diversify their sources of short-term borrowings and provide an additional financial instrument to investors with a freely negotiable interest rate.

9. Determination of Interest Rates

Call money rates were regulated in the past by the RBI or by a voluntary agreement between the participants through the intermediation of the Indian Bank Association (IBA). Now, the interest rates have been regulated and left to the market forces of demand for and supply of short-term money as a part of the financial sector reforms.

10. Recent Development in Money Market

- (i) **Debt Securitisation:** It means converting retail loans into whole sale loans. The philosophy behind the arrangement is that an individual body cannot go on lending sizable amount for about a longer period continuously but if loan amount is divided in small pieces and made transferable like negotiable instruments in the secondary market, it becomes easy to finance large projects having long gestation period.
- (ii) **Money Market Mutual Funds (MMMFs):** These Mutual Funds are primarily intended for individual investors including NRIs who may invest on a non-repatriable basis.

- (iii) **Repurchase Options (Repo) and Ready Forward (RFS) Contracts:** Under this transaction the borrower places with lender certain acceptable securities against funds received and agrees to reverse this transaction on a pre-determined future date at an agreed interest cost. While Ready Forward transaction are structured to suit the requirements of both borrowers/ and lenders and have therefore, become extremely popular mode of raising/investing short-term funds.

Question 1

Write a short note on commercial paper.

Answer

Commercial Paper: Commercial paper (CP) has its origin in the financial markets of America and Europe. When the process of financial dis-intermediation started in India in 1990, RBI allowed issue of two instruments, viz., the Commercial Paper (CP) and the Certificate of Deposit (CD) as a part of reform in the financial sector as suggested by Vaghul Committee. A notable feature of RBI Credit Policy announced on 16.10.1993 was the liberalisation of terms of issue of CP. At present it provides the cheapest source of funds for corporate sector and banks. Its market has picked up considerably in India due to interest rate differentials in the inter-bank and commercial lending rates.

Commercial Paper (CP) is an unsecured debt instrument in the form of a promissory note issued by highly rated borrowers for tenors ranging between 15 days and one year. "Corporates raise funds through CPs on an on-going basis throughout the year".

Thus, CP is a short term unsecured promissory note issued by high quality corporate bodies directly to investors to fund their business activities.

Question 2

Write a short note on Treasury bills.

Answer

Treasury Bills: Treasury bills are short-term debt instruments of the Central Government, maturing in a period of less than one year. Treasury bills are issued by RBI on behalf of the Government of India for periods ranging from 91 days to 364 days through regular auctions. They are highly liquid instruments and issued to tide over short-term liquidity shortfalls.

Treasury bills are sold through an auction process according to a fixed auction calendar announced by the RBI. Banks and primary dealers are the major bidders in the competitive auction process. Provident Funds and other investors can make non-competitive bids. RBI makes allocation to non-competitive bidders at a weighted average

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yield arrived at on the basis of the yields quoted by accepted competitive bids. These days the treasury bills are becoming very popular on account of falling interest rates. Treasury bills are issued at a discount and redeemed at par. Hence, the implicit yield on a treasury bill is a function of the size of the discount and the period of maturity. Now, these bills are becoming part of debt market. In India, the largest holders of the treasury bills are commercial banks, trust, mutual funds and provident funds.

Question 3

Explain briefly 'Call Money' in the context of financial market.

Answer

Call Money: The Call Money is a part of the money market where, day to day surplus funds, mostly of banks, are traded. Moreover, the call money market is most liquid of all short-term money market segments.

The maturity period of call loans vary from 1 to 14 days. The money that is lent for one day in call money market is also known as 'overnight money'. The interest paid on call loans are known as the call rates. The call rate is expected to freely reflect the day-to-day lack of funds. These rates vary from day-to-day and within the day, often from hour-to-hour. High rates indicate the tightness of liquidity in the financial system while low rates indicate an easy liquidity position in the market.

In India, call money is lent mainly to even out the short-term mismatches of assets and liabilities and to meet CRR requirement of banks. The short-term mismatches arise due to variation in maturities i.e. the deposits mobilized are deployed by the bank at a longer maturity to earn more returns and duration of withdrawal of deposits by customers vary. Thus, the banks borrow from call money markets to meet short-term maturity mismatches.

Moreover, the banks borrow from call money market to meet the cash Reserve Ratio (CRR) requirements that they should maintain with RBI every fortnight and is computed as a percentage of Net Demand and Time Liabilities (NDTL).

Question 4

Distinguish between Money market and Capital Market.

Answer

The capital market deals in financial assets. Financial assets comprises of shares, debentures, mutual funds etc. The capital market is also known as stock market.

Stock market and money market are two basic components of Indian financial system. Capital market deals with long and medium term instruments of financing while money market deals with short term instruments.

Some of the points of distinction between capital market and money market are as follows:

	Money Market	Capital Market
(i)	There is no classification between primary market and secondary market	There is a classification between primary market and secondary market.
(ii)	It deals for funds of short-term requirement.	It deals with funds of long-term requirement.
(iii)	Money market instruments include interbank call money, notice money upto 14 days, short-term deposits upto three months, commercial paper, 91 days treasury bills.	Capital Market instruments are shares and debt instruments.
(iv)	Money market participants are banks, financial institution, RBI and Government	Capital Market participants include retail investors, institutional investors like Mutual Funds, Financial Institutions, corporate and banks.

Question 5

What is interest rate risk, reinvestment risk & default risk & what are the types of risk involved in investments in G-Sec.?

Answer

Interest Rate Risk: Interest Rate Risk, market risk or price risk are essentially one and the same. These are typical of any fixed coupon security with a fixed period to maturity. This is on account of inverse relation of price and interest. As the interest rate rises the price of a security will fall. However, this risk can be completely eliminated in case an investor's investment horizon identically matches the term of security.

Re-investment Risk: This risk is again akin to all those securities, which generate intermittent cash flows in the form of periodic coupons. The most prevalent tool deployed to measure returns over a period of time is the yield-to-maturity (YTM) method. The YTM calculation assumes that the cash flows generated during the life of a security is reinvested at the rate of YTM. The risk here is that the rate at which the interim cash flows are reinvested may fall thereby affecting the returns.

Default Risk: This type of risk in the context of a Government security is always zero. However, these securities suffer from a small variant of default risk i.e. maturity risk. Maturity risk is the risk associated with the likelihood of government issuing a new

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security in place of redeeming the existing security. In case of Corporate Securities it is referred to as credit risk.

G. Secs are usually referred to as risk free securities. However, these securities are subject to only one type of risk i.e. interest rate risk. Subject to changes in the overall interest rate scenario, the price of these securities may appreciate or depreciate.

Question 6

Write a short note on Inter Bank Participation Certificate.

Answer

Inter Bank Participation Certificate (IBPC)

The Inter Bank Participation Certificates are short term instruments to even out the short term liquidity within the Banking system particularly when there are imbalances affecting the maturity mix of assets in Banking Book.

The primary objective is to provide some degree of flexibility in the credit portfolio of banks. It can be issued by schedule commercial bank and can be subscribed by any commercial bank.

The IBPC is issued against an underlying advance, classified standard and the aggregate amount of participation in any account time issue. During the currency of the participation, the aggregate amount of participation should be covered by the outstanding balance in account.

There are two types of participation certificates, with risk to the lender and without risk to the lender. Under 'with risk participation', the issuing bank will reduce the amount of participation from the advances outstanding and participating bank will show the participation as part of its advances. Banks are permitted to issue IBPC under 'with risk' nomenclature classified under Health Code-I status and the aggregate amount of such participation in any account should not exceed 40% of outstanding amount at the time of issue. The interest rate on IBPC is freely determined in the market. The certificates are neither transferable nor prematurely redeemable by the issuing bank.

Under without risk participation, the issuing bank will show the participation as borrowing from banks and participating bank will show it as advances to bank.

The scheme is beneficial both to the issuing and participating banks. The issuing bank can secure funds against advances without actually diluting its asset-mix. A bank having the highest loans to total asset ratio and liquidity bind can square the situation by issuing IBPCs. To the lender, it provides an opportunity to deploy the short-term surplus funds in a secured and profitable manner. The IBPC with risk can also be used for capital adequacy management.

This is simple system as compared to consortium tie up.

Question 7

Discuss the major sources available to an Indian Corporate for raising foreign currency finances.

Answer

Major Sources Available to an Indian Corporate for Raising Foreign Currency Finances

1. **Foreign Currency Term Loan from Financial Institutions:** Financial Institutions provide foreign currency term loan for meeting the foreign currency expenditures towards import of plant, machinery, and equipment and also towards payment of foreign technical knowhow fees.
2. **Export Credit Schemes:** Export credit agencies have been established by the government of major industrialized countries for financing exports of capital goods and related technical services. These agencies follow certain consensus guidelines for supporting exports under a convention known as the Berne Union. As per these guidelines, the interest rate applicable for export credits to Indian companies for various maturities is regulated. Two kinds of export credit are provided i.e., buyer's and supplier's credit.

Buyer's Credit- Under this arrangement, credit is provided directly to the Indian buyer for purchase of capital goods and/or technical service from the overseas exporter.

Supplier's Credit - This is a credit provided to the overseas exporters so that they can make available medium-term finance to Indian importers.

3. **External Commercial Borrowings:** Subject to certain terms and conditions, the Government of India permits Indian firms to resort to external commercial borrowings for the import of plant and machinery. Corporates are allowed to raise up to a stipulated amount from the global markets through the automatic route. Companies wanting to raise more than the stipulated amount have to get an approval of the MOF. ECBs include bank loans, supplier's and buyer's credit, fixed and floating rate bonds and borrowing from private sector windows of Multilateral Financial Institution such as International Finance Corporation.
4. **Euro Issues:** The two principal mechanisms used by Indian companies are Depository Receipts mechanism and Euro convertible Issues. The former represents indirectly equity investment while the latter is debt with an option to convert it into equity.

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5. **Issues in Foreign Domestic Markets:** Indian firms can also issue bonds and Equities in the domestic capital market of a foreign country. In recent year, Indian companies like Infosys Technologies and ICICI have successfully tapped the US equity market by issuing American Depository Receipts (ADRs). Like GDRs, ADRs represent claim on a specific number of shares. The principal difference between the two is that the GDRs are issued in the euro market whereas ADRs are issued in the U.S. domestic capital market.

Question 8

What are a Repo and a Reverse Repo?

Answer

A Repo deal is one where eligible parties enter into a contract another to borrow money at a predetermined rate against the collateral of eligible security for a specified period of time. The legal title of the security does changes. The motive of the deal is to fund a position. Though the mechanics essentially remains the same and the contract virtually remains the same, in case of reverse Repo deal the underlying motive of the deal is to meet the security/instrument specific needs or to lend the money. Indian Repo market is governed by Reserve Bank of India. At present Repo is permitted between 64 players against Central and State Government Securities (including T-Bills) at Mumbai.

Question 9

M Ltd. has to make a payment on 30th January, 2010 of Rs. 80 lakhs. It has surplus cash today, i.e. 31st October, 2009; and has decided to invest sufficient cash in a bank's Certificate of Deposit scheme offering an yield of 8% p.a. on simple interest basis. What is the amount to be invested now?

Answer

Calculation of Investment Amount

Amount required for making payment on 30 th January, 2010	= Rs. 80,00,000
Investment in Certificates of Deposit (CDs) on 31 st October, 2009	
Rate of interest	= 8% p.a.
No. of days to maturity	= 91 days
Interest on Re. 1 of 91 days	
(Re. 1 × 0.08 × 91/365)	= 0.0199452
Amount to be received for Re. 1	
(Re.1.00 + Re. 0.0199452)	= 1.0199452

Calculation of amount to be invested now to get Rs. 80 lakhs after 91 days:

$$= \frac{\text{Rs. } 80,00,000}{\text{Rs. } 1.0199452} = \text{Rs. } 78,43,558.65$$

Or, Rs. 78,43,600 or Rs. 78,44,000 approximately.

Question 10

RBI sold a 91 day T-bill of face value of Rs. 100 at an yield of 6%. What was the issue price?

Answer

Let the issue price be X

By the terms of the issue of the T-bills:

$$6\% = \frac{100 - x}{x} \times \frac{365}{91} \times 100$$

$$6\% = \frac{6 \times 91 \times x}{36,500} = (100 - x)$$

$$= 0.01496 \times = 100 - x$$

$$x = \frac{100}{1.01496} = \text{Rs. } 98.53$$

Question 11

From the following particulars, calculate the effective interest p.a. as well as the total cost of funds to ABC Ltd., which is planning a CP issue:

Issue Price of CP = Rs.97,350

Face Value = Rs.1,00,000

Maturity period = 3 months.

Issue Expenses:

Brokerage: 0.125% for 3 months.

Rating Charges: 0.5% p.a.

Stamp duty: 0.125% for 3 months

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Answer

$$\begin{aligned}
 \text{(a) Effective Interest} &= \frac{\frac{F - P}{P} \times \frac{12}{m}}{\frac{F - P}{P} \times \frac{12}{m} + 1} \times 100 \\
 &= \frac{\frac{100,000 - 97,350}{97,350} \times \frac{12}{3}}{\frac{100,000 - 97,350}{97,350} \times \frac{12}{3} + 1} \times 100 \\
 &= 0.02722 \times 4 \times 100 \\
 &= 10.888 \\
 &= 10.89
 \end{aligned}$$

Effective Interest = 10.89% p.a

Cost of Funds to the Company

Effective Interest	10.89%
Brokerage (0.125 x 4)	0.50%
Rating Charge	0.50%
Stamp Duty (0.125 x 4)	<u>0.50%</u>
Cost of funds	<u>12.39%</u>

EXERCISES**Question**

Turbo Sales Corporation is a wholesale corporation for heavy machines, is planning for an expansion of their activities resulting in a doubling of its sales. The finance head of the corporation has determined it needs an additional Rs. 20 crores in short term funds to meet finance need in the peak season roughly 6 months of the year. Mr. X, Treasury Head of the Corporation recommended that the corporation should use commercial papers offer to meet the finance needs.

The corporation shall have to offer 10% interest (paid in advance or discounted) plus a sum of Rs. 1,25,000 shall be incurred to meet the floatation cost. The paper would carry a 6 months (180 day) maturity.

Compute the effective cost of credit.

(Answer: 10.66%.)

FOREIGN DIRECT INVESTMENT (FDI), FOREIGN INSTITUTIONAL INVESTMENT (FIIs) AND INTERNATIONAL FINANCIAL MANAGEMENT

BASIC CONCEPTS AND FORMULAE

1. Introduction

Foreign direct investment (FDI) is that investment, which is made to serve the business interest of the investor in a company, which is in a different national (host country) distinct from the investor's country of origin (home country).

2. Cost Involved

Although FDI improves balance of payments position but it involves following costs for the host country :

- (a) MNCs are reluctant to hire and train local persons.
- (b) Damage to environment and natural resources.
- (c) Higher prices of products.
- (d) Foreign culture infused.

Apart from the above costs, FDI causes a transfer of capital, skilled personnel and managerial talent from the country resulting in the home country's interest being hampered. Further, the objective of maximization of profit of MNCs also leads to deterioration in bilateral relations between the host country and the home country.

3. Benefits Derived

(i) For the Host Country

- (a) Improves balance of payment.
- (b) Faster forward and backward economic linkages.
- (c) Develop a support base essential for quick industrialization.

- (d) Maintain a proper balance amongst the factor of production by supply of scarce resources.
- (e) Make available key raw materials alongwith updated technology and also provide access to continued updation of R & D work.
- (ii) For the Home Country
 - (a) BOP situation improves due to receipt of dividend, royalty, fee for technical services.
 - (b) Develop closer political relationships between the home country and the host country, which is advantageous to both.

4. Foreign Institutional Investment

An investor or investment fund that is from or registered in a country outside of the one in which it is currently investing. Institutional investors include hedge funds, insurance companies, pension funds and mutual funds. In Indian context, it refers to outside companies investing in the financial markets of India. International Institutional investors must register with the Securities and Exchange Board of India to participate in the market. One of the major market regulations pertaining to FIIs involves placing limits on FII ownership in Indian companies.

5. Raising of Capital Abroad (ADRs, GDRs, ECBs)

The various sources of international finance are as follows :

- (a) **External Commercial Borrowings:** Mainly it includes commercial bank loans, buyer and supplier's credit credit from official export credit agencies and investment by FIIs in dedicated debt funds. The external commercial borrowing can be obtained and utilized for specified purposes only.
- (b) **International Capital Market:** Lending and borrowing in foreign currencies to finance the international trade and industry has led to the development of international capital market. In international market, International bond is known as a "Euroboard".

6. Instruments of International Finance

The various financial instruments dealt with in the international market are briefly described below :

- **Euro Bonds:** Denominated in a currency issued outside the country of that currency.

- **Foreign Bonds:** Example a British firm placing dollar denominated bonds in U.S.A.
- **Fully Hedged Bonds:** Currency risk eliminated by selling in forward market entire stream of interest and principal payments.
- **Floating Rate Notes:** Interests are adjusted to reflect the prevailing exchange rate, Not so popular.
- **Euro Commercial Papers:** Designated in US Dollar, they are short-term instruments.
- **Foreign Currency Options:** Provide hedge against financial and economic risk.
- **Foreign Currency Futures:** Obligation to buy or sell a specified currency in the present for settlement at a future dates.

7. Indian Depository Receipts (IDRs)

Like ADRs and GDRs, foreign companies are now available for investments in India in the form of IDRs. Investment in these companies can be made by Indian investors. However, such companies would be required to fulfill a number of guidelines for listing in India through IDRs.

8. International Financial Instruments and Indian Companies

Now Indian Companies have been able to tap global markets to raise foreign currency funds by issuing various types of financial instruments which are as follows :

- (a) **Foreign Currency Convertible Bonds (FCCBs)** – A type of convertible bond issues in a currency different than the issuer's domestic currency. FCCBs are issued in accordance with the guidelines dated 12th November 1993 and as amended from time to time.
- (b) **Global Depository Receipts (GDRs)** – GDR is a depository receipt (a negotiable certificate denominated in US Dollars, representing a non-US company's publicly – traded local currency (Indian rupees) equity shares.
- (c) **Euro-Convertible Bonds (ADRs)** – A Convertible bond is a debt instrument which gives the holders of the bond an option to convert the bond into a predetermined number of equity shares of a company. The payment of interest on and the redemption of the bond will be made by the issuer company in US dollars.

(d) **American Depository Receipts (ADRs)** – Depository receipts issued by a company in the United States of America (USA) issued in accordance with provisions stipulated by the Securities and Exchange Commission of USA. ADRs are following types:

- (i) **Un-sponsored ADRs** – Issued without any formal agreement between the issuing company and the depository.
- (ii) **Sponsored ADRs** – Created by a single depository which is appointed by the issuing company under rules provided in a deposit agreement. These can be further classified into following two types :
 - **Restricted** – With respect to types of buyers, which are allowed.
 - **Unrestricted** – Issued to and traded by the general investing public in US capital markets.

(e) **Other Sources**

Following are some other sources

- Euro Bonds
- Euro-convertible Zero Bonds
- Euro-bond with Equity Warrants.
- Syndicated Bank Loans.
- Euro Bonds.
- Foreign Bonds
- Euro Commercial Papers
- Credit Instruments.

(f) **Euro-Issues** – In Indian context, it denotes the issue that is listed on a European Stock Exchange. However, subscription can come from any part of the World except India. GDRs and FCCBs are most popular in this category.

9. Cross Border Leasing

In this type of leasing, the lessor and the lessee are situated in two different countries. This type of arrangement means more complications in terms of different legal, fiscal, credit and currency requirements and risk involved. Cross border lease benefits are more or less the same as are available in domestic lease viz 100% funding off-balance sheets.

10. International Capital Budgeting

Multinational Capital Budgeting has to take into consideration the different factors and variables which affect a foreign project and are complex in nature than domestic projects. An important aspect in multinational capital budgeting is to adjust cash flows or the discount rate for additional risk arising from location of the project. Adjusted Present Value (APV) is used in evaluating foreign projects. The APV model is a value additive approach under which each cash flow is considered individually and discounted at a rate consistent with risk involved in the cash flow.

11. International Working Capital Management

The management of working capital in an international firm is very much complex as compared to domestic one because of the following reasons :

- A multinational firm has a wider option for financing its current assets.
- Interest and tax rates vary from one country to other.
- Presence of foreign exchange risk.
- Limited knowledge of the politico-economic conditions prevailing in different host countries.

12. Multinational Cash Management

The main objectives of multinational cash management are minimizing various risk and transaction costs associated with cash management. Broadly, following are two basic objectives of International Cash Management – first is optimizing cash flow movements and second is investing excess cash.

(a) Optimizing Cash Flow Movements

Following are ways by which cash flow movement can be optimized:

- (i) Accelerating Cash Inflows.
- (ii) Managing Blocked Funds.
- (iii) Leading and Lagging.
- (iv) Netting.
- (v) International Transfer Pricing.

(b) Investing Excess Cash

Through centralized cash management, decision about stock piling (EOQ) is to be weighted in light of cumulative carrying cost vis-à-vis expected increase in the price of input due to changes in the exchange rate.

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Normally, final decision on the quantity of goods to be imported and how much of them are locally available.

13. International Receivables Management

International receivables management can be discussed under two heads which are as follows :

- (a) Inter-firm Sales – The focus is on the currency of denomination.
- (b) Intra-firm Sales – The focus is on global allocation of firm's resources.

Question 1

Write a short note on Euro Convertible Bonds.

Answer

Euro Convertible Bonds: They are bonds issued by Indian companies in foreign market with the option to convert them into pre-determined number of equity shares of the company. Usually price of equity shares at the time of conversion will fetch premium. The Bonds carry fixed rate of interest.

The issue of bonds may carry two options:

Call option: Under this the issuer can call the bonds for redemption before the date of maturity. Where the issuer's share price has appreciated substantially, i.e., far in excess of the redemption value of bonds, the issuer company can exercise the option. This call option forces the investors to convert the bonds into equity. Usually, such a case arises when the share prices reach a stage near 130% to 150% of the conversion price.

Put option: It enables the buyer of the bond a right to sell his bonds to the issuer company at a pre-determined price and date. The payment of interest and the redemption of the bonds will be made by the issuer-company in US dollars.

Question 2

Write short note on American Depositary Receipts (ADRs).

Answer

American Depositary Receipts (ADRs): A depository receipt is basically a negotiable certificate denominated in US dollars that represent a non- US Company's publicly traded local currency (INR) equity shares/securities. While the term refer to them is global depository receipts however, when such receipts are issued outside the US, but issued for trading in the US they are called ADRs.

An ADR is generally created by depositing the securities of an Indian company with a custodian bank. In arrangement with the custodian bank, a depository in the US issues the ADRs. The ADR subscriber/holder in the US is entitled to trade the ADR and generally enjoy rights as owner of the underlying Indian security. ADRs with special/unique features have been developed over a period of time and the practice of issuing ADRs by Indian Companies is catching up.

Only such Indian companies that can stake a claim for international recognition can avail the opportunity to issue ADRs. The listing requirements in US and the US GAAP requirements are fairly severe and will have to be adhered. However if such conditions are met ADR becomes an excellent sources of capital bringing in foreign exchange.

These are depository receipts issued by a company in USA and are governed by the provisions of Securities and Exchange Commission of USA. As the regulations are severe, Indian companies tap the American market through private debt placement of GDRS listed in London and Luxemburg stock exchanges.

Apart from legal impediments, ADRS are costlier than Global Depository Receipts (GDRS). Legal fees are considerably high for US listing. Registration fee in USA is also substantial. Hence, ADRS are less popular than GDRS.

Question 3

Write a short note on Forfaiting.

Answer

Forfaiting: During recent years the forfaiting has acquired immense importance as a source of financing. It means 'surrendering' or relinquishing rights to something. This is very commonly used in international practice among the exporters and importers. In the field of exports, it implies surrenders by an exporter of the claim to receive payment for goods or services rendered to an importer in return for cash payment for those goods and services from the forfaiter (generally a bank), who takes over the importer's promissory notes or the exporters' bills of exchange. The forfaiter, thus assumes responsibility for the collection of such documents from the importer. This arrangement is to help exporter, however, there is always a fixed cost of finance by way of discounting of the debt instruments by the forfaiter. Forfaiting assumes the nature of a purchase transaction without recourse to any previous holder in respect of the instrument of debts at the time of maturity in future.

The exporter generally takes bill or promissory notes to the forfaiter which buys the instrument at a discount from the face value. The importer party's bank has already guaranteed payment unconditionally and irrevocably, and the exporter party's bank now takes complete responsibility for collection without recourse to exporter. Thus a forfaiting arrangement eliminates all credit risks. It also protects against the possibility that interest

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rate may fluctuate before the bills or notes are paid off. Any adverse movement in exchange rate, any political uncertainties or business conditions may change to the disadvantage of the parties concerned. The forfaiting business is very common in Europe and has come as an important source of export financing in leading currencies.

Question 4

Write a short note on Global Depository Receipts (GDRs).

Answer

Global Depository Receipt: It is an instrument in the form of a depository receipt or certificate created by the Overseas Depository Bank outside India denominated in dollar and issued to non-resident investors against the issue of ordinary shares or FCCBs of the issuing company. It is traded in stock exchange in Europe or USA or both. A GDR usually represents one or more shares or convertible bonds of the issuing company.

A holder of a GDR is given an option to convert it into number of shares/bonds that it represents after 45 days from the date of allotment. The shares or bonds which a holder of GDR is entitled to get are traded in Indian Stock Exchanges. Till conversion, the GDR does not carry any voting right. There is no lock-in-period for GDR.

Impact of GDR's on Indian Capital Market

Since the inception of GDR's a remarkable change in Indian capital market has been observed as follows:

- (i) Indian stock market to some extent is shifting from Bombay to Luxemburg.
- (ii) There is arbitrage possibility in GDR issues.
- (iii) Indian stock market is no longer independent from the rest of the world. This puts additional strain on the investors as they now need to keep updated with worldwide economic events.
- (iv) Indian retail investors are completely sidelined. GDR's/Foreign Institutional Investors' placements + free pricing implies that retail investors can no longer expect to make easy money on heavily discounted rights/public issues.

As a result of introduction of GDR's a considerable foreign investment has flown into India. This has also helped in the creation of specific markets like

- (i) GDR's are sold primarily to institutional investors.
- (ii) Demand is likely to be dominated by emerging market funds.
- (iii) Switching by foreign institutional investors from ordinary shares into GDR's is likely.

- (iv) Major demand is also in UK, USA (Qualified Institutional Buyers), South East Asia (Hong Kong, Singapore), and to some extent continental Europe (principally France and Switzerland).

The following parameters have been observed in regard to GDR investors.

- (i) Dedicated convertible investors.
- (ii) Equity investors who wish to add holdings on reduced risk or who require income enhancement.
- (iii) Fixed income investors who wish to enhance returns.
- (iv) Retail investors: Retail investment money normally managed by continental European banks which on an aggregate basis provide a significant base for Euro-convertible issues.

Question 5

Explain the term 'Exposure netting', with an example.

Answer

Exposure Netting refers to offsetting exposures in one currency with Exposures in the same or another currency, where exchange rates are expected to move in such a way that losses or gains on the first exposed position should be offset by gains or losses on the second currency exposure.

The objective of the exercise is to offset the likely loss in one exposure by likely gain in another. This is a manner of hedging foreign exchange exposures though different from forward and option contracts. This method is similar to portfolio approach in handling systematic risk.

For example, let us assume that a company has an export receivables of US\$ 10,000 due 3 months hence, if not covered by forward contract, here is a currency exposure to US\$.

Further, the same company imports US\$ 10,000 worth of goods/commodities and therefore also builds up a reverse exposure. The company may strategically decide to leave both exposures open and not covered by forward, it would be doing an exercise in exposure netting.

Despite the difficulties in managing currency risk, corporates can now take some concrete steps towards implementing risk mitigating measures, which will reduce both actual and future exposures. For years now, banking transactions have been based on the principle of netting, where only the difference of the summed transactions between the parties is actually transferred. This is called settlement netting. Strictly speaking in banking terms this is known as settlement risk. Exposure netting occurs where outstanding positions are netted against one another in the event of counter party default.

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Question 6

Distinguish between Forfeiting and Factoring.

Answer

Forfeiting was developed to finance medium to long term contracts for financing capital goods. It is now being more widely used in the short-term also especially where the contracts involve large values. There are specialized finance houses that deal in this business and many are linked to some of main banks.

This is a form of fixed rate finance which involves the purchase by the forfeiture of trade receivables normally in the form of trade bills of exchange or promissory notes, accepted by the buyer with the endorsement or guarantee of a bank in the buyer's country.

The benefits are that the exporter can obtain full value of his export contract on or near shipment without recourse. The importer on the other hand has extended payment terms at fixed rate finance.

The forfeiture takes over the buyer and country risks. Forfeiting provides a real alternative to the government backed export finance schemes.

Factoring can however, broadly be defined as an agreement in which receivables arising out of sale of goods/services are sold by a "firm" (client) to the "factor" (a financial intermediary) as a result of which the title to the goods/services represented by the said receivables passes on to the factor. Henceforth, the factor becomes responsible for all credit control, sales accounting and debt collection from the buyer(s). In a full service factoring concept (without recourse facility) if any of the debtors fails to pay the dues as a result of his financial instability/insolvency/bankruptcy, the factor has to absorb the losses.

Some of the points of distinction between forfeiting and factoring have been outlined in the following table.

Factoring	Forfeiting
This may be with recourse or without recourse to the supplier.	This is without recourse to the exporter. The risks are borne by the forfeiter.
It usually involves trade receivables of short maturities.	It usually deals in trade receivables of medium and long term maturities.
It does not involve dealing in negotiable instruments.	It involves dealing in negotiable instrument like bill of exchange and promissory note.

The seller (client) bears the cost of factoring.

The overseas buyer bears the cost of forfeiting.

Usually it involves purchase of all book debts or all classes of book debts.

Forfeiting is generally transaction or project based. Its structuring and costing is case to case basis.

Factoring tends to be a 'case of' sell of debt obligation to the factor, with no secondary market.

There exists a secondary market in forfeiting. This adds depth and liquidity to forfeiting.

Question 7

Write a brief note on External Commercial Borrowings (ECBs).

Answer

ECB include bank loans, supplier credit, securitised instruments, credit from export credit agencies and borrowings from multilateral financial institutions. These securitised instruments may be FRNs, FRBs etc. Indian corporate sector is permitted to raise finance through ECBs within the framework of the policies and procedures prescribed by the Central Government. Multilateral financial institutions like IFC, ADB, AFIC, CDC are providing such facilities while the ECB policy provides flexibility in borrowing consistent with maintenance of prudential limits for total external borrowings, its guiding principles are to keep borrowing maturities long, costs low and encourage infrastructure/core and export sector financing which are crucial for overall growth of the economy. The government of India, from time to time changes the guidelines and limits for which the ECB alternative as a source of finance is pursued by the corporate sector. During past decade the government has streamlined the ECB policy and procedure to enable the Indian companies to have their better access to the international financial markets.

The government permits the ECB route for variety of purposes namely expansion of existing capacity as well as for fresh investment. But ECB can be raised through internationally recognized sources. There are caps and ceilings on ECBs so that macro economy goals are better achieved. Units in SEZ are permitted to use ECBs under a special window.

Question 8

Write a short note on Debt route for foreign exchange funds.

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Answer

Debt route for foreign exchange funds: The following are some of the instruments used for borrowing of funds from the international market:

- (i) *Syndicated bank loans:* The borrower should obtain a good credit rating from the rating agencies. Large loans can be obtained in a reasonably short period with few formalities. Duration of the loan is generally 5 to 10 years. Interest rate is based on LIBOR plus spread depending upon the rating. Some covenants are laid down by the lending institutions like maintenance of key financial ratios.
- (ii) *Euro bonds:* These are basically debt instruments denominated in a currency issued outside the country of the currency. For example, Yen bond floated in France. Primary attraction of these bonds is the shelter from tax and regulations which provide Scope for arbitraging yields. These are usually bearer bonds and can take the form of (i) traditional fixed rate bonds (ii) floating rate notes (FRN's) (iii) Convertible bonds.
- (iii) *Foreign bonds:* Foreign bonds are foreign currency bonds and sold at the country of that currency and are subject to the restrictions as placed by that country on the foreigners' funds.
- (iv) *Euro Commercial Papers:* These are short term money market securities usually issued at a discount, for maturity in less than one year.
- (v) *External Commercial Borrowings (ECB's):* These include commercial bank loans, buyer's credit and supplier's credit, securitised instruments such as floating rate notes and fixed rate bonds, credit from official export credit agencies and commercial borrowings from multi-lateral financial institutions like IFCI, ADB etc. External Commercial borrowings have been a popular source of financing for most of capital goods imports. They are gaining importance due to liberalization of restrictions. ECB's are subject to overall ceilings with sub-ceilings fixed by the government from time to time.
- (vi) All other loans are approved by the government.

Question 9

Write a short note on the application of Double taxation agreements on Global depository receipts.

Answer

- (i) During the period of judiciary ownership of shares in the hands of the overseas depository bank, the provisions of avoidance of double taxation agreement entered into

by the Government of India with the country of residence of the overseas depository bank will be applicable in the matter of taxation of income from dividends from the underline shares and the interest on foreign currency convertible bounds.

- (ii) During the period if any, when the redeemed underline shares are held by the non-residence investors on transfer from fudiciary ownership of the overseas depository bank, before they are sold to resident purchasers, the avoidance of double taxation agreement entered into by the government of India with the country of residence of the non-resident investor will be applicable in the matter of taxation of income from dividends from the underline shares, or interest on foreign currency convertible bonds or any capital gains arising out of the transfer of the underline shares.

FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

BASIC CONCEPTS AND FORMULAE

1. Foreign Exchange Market

The foreign exchange market is the market in which individuals, firms and banks buy and sell foreign currencies or foreign exchange. The purpose of the foreign exchange market is to permit transfers of purchasing power denominated in one currency to another i.e. to trade one currency for another. Like any other market buyer and seller exist in this market and the demand and supply functions play a big role in determination of exchange rate of the currency.

2. Exchange Rate Determination

An exchange rate is, simply, the price of one nation's currency in terms of another currency, often termed as the reference currency. The foreign exchange market includes both the spot and forward exchange rates.

- (a) The Spot Market: A spot rate occurs when buyers and sellers of currencies agree for immediate delivery of the currency.
- (b) The Forward Market: A forward exchange rate occurs when buyers and sellers of currencies agree to deliver the currency at some future date. The forward exchange rate is set and agreed by the parties and remains fixed for the contract period regardless of the fluctuations in the spot exchange rates in future.

3. Exchange Rate Quotation

- (a) Direct and Indirect Quote: A foreign exchange quotation can be either a direct quotation and or an indirect quotation, depending upon the home currency of the person concerned. A direct quote (also called the European terms) is the home currency price of one unit of foreign currency. An indirect quote (also called the American terms) is the foreign currency price of one unit of the home currency. Mathematically, expressed as follows:

Direct quote = $1/\text{indirect quote}$ and vice versa

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- (b) **Bid, Offer and Spread:** Foreign exchange quotes are two-way quotes, expressed as a 'bid and an offer' (or ask) price. Bid is the price at which the dealer is willing to buy another currency. The offer is the rate at which he is willing to sell another currency.

4. Exchange Rate Forecasting

Corporates need to do the exchange rate forecasting for taking decisions regarding hedging, short-term financing, short-term investment, capital budgeting, earnings assessments and long-term financing. Investors and traders need tools to select and analyze the right data from the vast amount of data available to them to help them make good decisions.

5. Techniques of Exchange Rate Forecasting

There are numerous methods available for forecasting exchange rates. They can be categorized into four general groups- technical, fundamental, market-based, and mixed.

- (a) **Technical Forecasting:** It involves the use of historical data to predict future values. For example time series models.
- (b) **Fundamental Forecasting:** It is based on the fundamental relationships between economic variables and exchange rates. For example subjective assessments, quantitative measurements based on regression models and sensitivity analyses.
- (c) **Market-Based Forecasting:** It uses market indicators to develop forecasts. The current spot/forward rates are often used, since speculators will ensure that the current rates reflect the market expectation of the future exchange rate.
- (d) **Mixed Forecasting:** It refers to the use of a combination of forecasting techniques. The actual forecast is a weighted average of the various forecasts developed.

6. Exchange Rate Theories

- (a) **Interest Rate Parity (IRP):** This theory which states that 'the size of the forward premium (or discount) should be equal to the interest rate differential between the two countries of concern'. When interest rate parity exists, covered interest arbitrage (means foreign exchange risk is covered) is not feasible, because any interest rate advantage in the foreign country will be offset by the discount on the forward rate.

Covered Interest Rate Parity equation is given by:

$$(1 + r_D) = \frac{F}{S} (1 + r_F)$$

Where,

$(1 + r_D)$ = Amount that an investor would get after a unit period by investing a rupee in the domestic market at r_D rate of interest and $\frac{F}{S} (1 + r_F)$ is the amount that an investor by investing in the foreign market at r_F so that the investment of one rupee yield same return in the domestic as well as in the foreign market.

Uncovered Interest Rate Parity equation is given by:

$$(1 + r_D) = \frac{S_1}{S} (1 + r_F)$$

Where,

S_1 = Expected future spot rate when the receipts denominated in foreign currency is converted into domestic currency.

- (b) Purchasing Power Parity (PPP): This theory focuses on the 'inflation-exchange rate' relationship.

There are two forms of PPP theory:

- Absolute Form- Also called the 'Law of One Price' suggests that "prices of similar products of two different countries should be equal when measured in a common currency". If a discrepancy in prices as measured by a common currency exists, the demand should shift so that these prices should converge.
- Relative Form – An alternative version that accounts for the possibility of market imperfections such as transportation costs, tariffs, and quotas. It suggests that 'because of these market imperfections, prices of similar products of different countries will not necessarily be the same when measured in a common currency.'

In Equilibrium Form:

$$S = a \frac{P_D}{P_F}$$

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Where,

S (Rs./ $\text{\$}$) = spot rate

P_D = is the price level in India, the domestic market.

P_F = is the price level in the foreign market, the US in this case.

A = Sectoral price and sectoral shares constant.

- (c) International Fisher Effect (IFE): According to this theory, ‘nominal risk-free interest rates contain a real rate of return and anticipated inflation’. This means if investors of all countries require the same real return, interest rate differentials between countries may be the result of differential in expected inflation.

The IFE equation can be given by:

$$r_D - P_D = r_F - DP_F \text{ or } P_D - P_F = DS = r_D - r_F$$

7. Comparison of PPP, IRP AND IFE Theories

Theory	Key	Variables	Summary
Interest Rate Parity (IRP)	Forward rate premium (or discount)	Interest rate differential	The forward rate of one currency will contain a premium (or discount) that is determined by the differential in interest rates between the two countries.
Purchasing Power Parity (PPP)	Percentage change in spot exchange rate	Inflation rate differential	The spot rate of one currency with respect to a nother will change in reaction to the differential in inflation rates between two countries.
International Fisher Effect (IFE)	Percentage change in spot exchange rate	Interest rate differential	The spot rate of one currency with respect to a nother will change in accordance with the differential in interest rates between the two countries.

8. Risk Management

A ‘risk’ is anything that can lead to results that deviate from the requirements. Risk Management is, “any activity which identifies risks, and takes action to remove or control ‘negative results’ (deviations from the r equirements).” Unpredictable changes in interest rates, yield curve structures, exchange rates, and commodity

prices, exacerbated by the explosion in international expansion, have made the financial environment riskier today than it ever was in the past. For this reason, boards of directors, shareholders, and executive and tactical management need to be seriously concerned that corporate risk management activities be adequately assessed, prioritized, driven by strategy, controlled, and reported.

9. Risk Considerations

There are several types of risk that an investor should consider and pay careful attention to. Some types of risk are as follows:

- (a) **Financial Risk:** It is the potential loss or danger due to the uncertainty in movement of foreign exchange rates, interest rates, credit quality, liquidity position, investment price, commodity price, or equity price, as well as the unpredictability of sales price, growth, and financing capabilities.
- (b) **Business Risk:** This risk, also known as investment risk, may materialize because of forecasting errors made in market acceptance of products, future technological changes, and changes in costs related to projects.
- (c) **Credit or Default Risk:** This type of risk is of particular concern to investors who hold bonds within their portfolio.
- (d) **Country Risk:** This refers to the risk that a country would not be able to honour its financial commitments. When a country defaults it can harm the performance of all other financial instruments in that country as well as other countries it has relations with.
- (e) **Interest Rate Risk:** It refers to the change in the interest rates. A rise in interest rates during the term of an investor's debt security hurts the performance of stocks and bonds.
- (f) **Political Risk:** This represents the financial risk that a country's government will suddenly change its policies.
- (g) **Market Risk:** It is the day-to-day fluctuations in a stock's price. It is also referred to as volatility.
- (h) **Foreign Exchange Risk:** Foreign exchange risk applies to all financial instruments that are in a currency other than the domestic currency.

10. Foreign Exchange Exposure

Foreign exchange exposure refers to those parts of a company's business that would be affected if exchange rate changes.

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11. Types of Exposures

- (a) **Transaction Exposure:** It measures the effect of an exchange rate change on outstanding obligations that existed before exchange rates changed but were settled after the exchange rate changed. Thus, it deals with cash flows that result from existing contractual obligations.
- (b) **Translation Exposure:** Also known as accounting exposure, it refers to gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for accounting purposes.
- (c) **Economic Exposure:** It refers to the extent to which the economic value of a company can decline due to changes in exchange rate. It is the overall impact of exchange rate changes on the value of the firm.

12. Techniques for Managing Exposure

The aim of foreign exchange risk management is to stabilize the cash flows and reduce the uncertainty from financial forecasts. Various techniques for managing the exposure are as follows:

- (A) **Derivatives:** A derivatives transaction is a bilateral contract or payment exchange agreement whose value depends on - derives from - the value of an underlying asset, reference rate or index. Every derivatives transaction is constructed from two simple building blocks that are fundamental to all derivatives: forwards and options. They include:

- (a) **Forwards-based Derivatives:** There are three divisions of forwards-based derivatives:

- (i) **The Forward Contract-**The simplest form of derivatives is the forward contract. It obliges one party to buy, and the other to sell, a specified quantity of a nominated underlying financial instrument at a specific price, on a specified date in the future.
- (ii) **Swaps-**Swaps are infinitely flexible. They are a method of exchanging the underlying economic basis of a debt or asset without affecting the underlying principal obligation on the debt or asset.

Swaps can be classified into the following groups:

- Interest rate;
- Currency;
- Commodity; and
- Equity.

(iii) **Futures Contracts-** A basic futures contract is very similar to the forward contract in its obligation and pay off profile. Some important distinctions between futures and forwards and swaps are:

- The contract terms of futures are standardized.
- All transactions are carried out through the exchange clearing system thus avoiding the other party risk.

(b) **Options:** They offer, in exchange for a premium, the right - but *not* the obligation - to buy or sell the underlying at the strike price during a period or on a specific date. So the owner of the option can choose not to exercise the option and let it expire.

An option is a contract which has one or other of the two key attributes:

- to buy (call option)- It is a contract that gives the buyer the right, but not the obligation, to buy a specified number of units of commodity or a foreign currency from the seller of option at a fixed price on or up to a specific date.
- to sell (put option)- It is a contract that gives the buyer the right, but not the obligation, to sell a specified number of units of commodity or a foreign currency to a seller of option at a fixed price on or up to a specific date.

The holder of an *American option* has the right to exercise the contract at any stage during the period of the option, whereas the holder of a *European option* can exercise his right only at the end of the period.

(B) **Money Market Hedge:** A money market hedge involves simultaneous borrowing and lending activities in two different currencies to lock in the home currency value of a future foreign currency cash flow. The simultaneous borrowing and lending activities enable a company to create a homemade forward contract.

(C) **Forward Market Hedge:** In a forward market hedge, a company that has a long position in a foreign currency will sell the foreign currency forward, whereas a company that has a short position in a foreign currency will buy the foreign currency forward. In this manner, the company can fix the dollar value of future foreign currency cash flow.

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- (D) **Netting:** Netting involves associated companies, which trade with each other. The technique is simple. Group companies merely settle inter affiliate indebtedness for the net amount owing. Gross intra-group trade, receivables and payables are netted out.
- (E) **Matching:** Matching is a mechanism whereby a company matches its foreign currency inflows with its foreign currency outflows in respect of amount and approximate timing. Receipts in a particular currency are used to make payments in that currency thereby reducing the need for a group of companies to go through the foreign exchange markets to the unmatched portion of foreign currency cash flows.
- (F) **Leading and Lagging:** Leading means paying an obligation in advance of the due date. Lagging means delaying payment of an obligation beyond its due date. Leading and lagging are foreign exchange management tactics designed to take advantage of expected devaluations and revaluations of currencies.
- (G) **Price Variation:** Price variation involves increasing selling prices to counter the adverse effects of exchange rate change.
- (H) **Invoicing in Foreign Currency:** Sellers usually wish to sell in their own currency or the currency in which they incur cost. This avoids foreign exchange exposure. For the buyer, the ideal currency is usually its own or one that is stable relative to it, or it may be a currency of which the purchaser has reserves.
- (I) **Asset and Liability Management:** Asset and liability management can involve aggressive or defensive postures. In the aggressive attitude, the firm simply increases exposed cash inflows denominated in currencies expected to be strong or increases exposed cash outflows denominated in weak currencies. By contrast, the defensive approach involves matching cash inflows and outflows according to their currency of denomination, irrespective of whether they are in strong or weak currencies.
- (J) **Arbitrage:** The simple notion in arbitrage is to purchase and sell a currency simultaneously in more than one foreign exchange markets. Arbitrage profits are the result of the difference in exchange rates at two different exchange centres and the difference, due to interest yield which can be earned at different exchanges.

13. Strategies for Exposure Management

Four separate strategy options are feasible for exposure management. They are:

- (a) **Low Risk: Low Reward-** This option involves automatic hedging of exposures in the forward market as soon as they arise, irrespective of the attractiveness or otherwise of the forward rate.
- (b) **Low Risk: Reasonable Reward-** This strategy requires selective hedging of exposures whenever forward rates are attractive but keeping exposures open whenever they are not.
- (c) **High Risk: Low Reward-** Perhaps the worst strategy is to leave all exposures unhedged.
- (d) **High Risk: High Reward-** This strategy involves active trading in the currency market through continuous cancellations and re-bookings of forward contracts. With exchange controls relaxed in India in recent times, a few of the larger companies are adopting this strategy.

14. Forward Rate Agreements (FRAs)

FRAs are cash-settled forward contracts on interest rates traded among major international banks active in the Eurodollar market. A bank that sells an FRA agrees to pay the buyer the increased interest cost on some "notional" principal amount if some specified maturity of LIBOR is above a stipulated "forward rate" on the contract maturity or settlement date. Conversely, the buyer agrees to pay the seller any decrease in interest cost if market interest rates fall below the forward rate. Thus, buying an FRA is comparable to selling, or going short, a Eurodollar or LIBOR futures contract.

15. Interest Rate Swaps

In an interest rate swap, the parties to the agreement, termed the swap counterparties, agree to exchange payments indexed to two different interest rates. Total payments are determined by the specified notional principal amount of the swap, which is never actually exchanged. Following are important terms associated with the Interest Rate Swaps:

- (a) **Swap Dealers-** They are the intermediaries.
- (b) **Swap Market Conventions-** There are many different variants of interest rate swaps. The most common is the fixed/floating swap.
- (c) **Timing of Payments-** A swap is negotiated on its "trade date" and takes effect two days later on its initial "settlement date."

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- (d) *Price Quotation*-The price of a fixed/floating swap is quoted in two parts: a fixed interest rate and an index upon which the floating interest rate is based. The floating rate can be based on an index of short-term market rates (such as a given maturity of LIBOR) plus or minus a given margin.
- (e) *Generic Swap*-Fixed interest payments on a generic swap typically are based on a 30/ 360 day-count convention whereas Floating-rate payments are based on an actual/360-day count.
- (f) *Day count Conventions*-Fixed payments can be quoted either on an actual/365 (bond equivalent) basis or on an actual/360 basis. Floating-rate payments indexed to private-sector interest rates typically follow an actual/360 day-count convention commonly used in the money market.
- (g) *Swap Valuation*- Following are two methods used for the valuation of fixed/floating swaps
 - Pricing the Variable-Rate Note
 - Pricing the Fixed Rate Note
- (h) *Non-par Swap*- A swap may be priced such that one party owes money to the other at the initial settlement.

16. Swaptions

An interest rate swaption is simply an option on an interest rate swap. It gives the holder the right but not the obligation to enter into an interest rate swap at a specific date in the future, at a particular fixed rate and for a specified term. For an up-front fee (premium), the customer selects the strike rate (the level at which it enters the interest rate swap agreement), the length of the option period, the floating rate index (Prime, LIBOR, C.P.), and tenor.

Swaptions fall into three main categories:

- a) European Swaptions give the buyer the right to exercise only on the maturity date of the option.
- b) American Swaptions, on the other hand, give the buyer the right to exercise at any time during the option period.
- c) Bermudan Swaptions give the buyer the right to exercise on specific dates during the option period.

17. Principal Features of Swaptions

- A fixed-rate payer swaption gives the buyer of the option the opportunity to lock into a fixed rate through an IRS on an agreed future date.

- The 'option period' refers to the time which elapses between the transaction date and the expiry date.
- The fixed rate of interest on the swaption is called the strike rate.
- The simplest type of swaption available is an option to pay or receive fixed-rate money against receiving or paying floating-rate money.
- At maturity of the swaption, one can decide whether to exercise the swap or to let the swaption lapse unexercised - all rights incurred by the holder will then terminate.
- The underlying instrument on which a swaption is based is a forward-start IRS.
- The buyer of a payer/receiver swaption pays a premium for the right but not the obligation to pay/receive the fixed rate and receive/pay the floating rate of interest on a forward-start IRS.
- The swaption premium is expressed as basis points.
- Swaptions can be cash-settled.
- Marking to market of a swaption depends on the strike rate of the swap and the relationship of the strike price to the underlying, where the underlying is the forward start IRS.
- The intrinsic value would therefore be related to a swap with a start date that coincides with the expiry date of the option.
- In the event of the swaption being cash-settled, the counterparties end up without actually transacting an IRS with each other - the advantage here being an effective management of credit limits.

18. Pricing of Swaptions

Because of its ease of use and market acceptance modified Black and Scholes model is used. However, the modified Black formula has been subject to extensive criticism from various sources over the years.

19. Caps and Floors versus Swaptions

A swaption only has one date of exercise compared to a cap (which is essentially a series of separate call options on forward rates).

20. Uses of Swaptions

- Swaptions can be applied in a variety of ways for both active traders as well as for corporate treasurers.

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- Swaptions have become useful tools for hedging embedded option which is common to the natural course of many businesses.
- Swaptions are useful to borrowers targeting an acceptable borrowing rate.
- Swaptions are also useful to those businesses tendering for contracts.
- Swaptions also provide protection on callable/putable bond issues.

21. Interest Rate Caps

The buyer of an interest rate cap pays the seller a premium in return for the right to receive the difference in the interest cost on some notional principal amount any time a specified index of market interest rates rises above a stipulated "cap rate." The buyer bears no obligation or liability if interest rates fall below the cap rate. Thus, a cap resembles an option that has a right rather than an obligation to the buyer.

Question 1

Outland Steel has a small but profitable export business. Contracts involve substantial delays in payment, but since the company has had a policy of always invoicing in dollars, it is fully protected against changes in exchange rates. More recently the sales force has become unhappy with this, since the company is losing valuable orders to Japanese and German firms that are quoting in customers' own currency. How will you, as Finance Manager, deal with the situation?

Answer

As a Finance Manager to deal with the situation two problems emerge – (i) the problem of negotiating individual contracts and (ii) managing the company's foreign exchange exposure.

The sales force can be allowed to quote in customer's own currency and hedge for currency risk by obtaining the forward contracts etc.

The finance manager can decide whether the company ought to insure. There are two ways of protecting against exchange loss. Firstly, by selling the foreign currency forward and secondly, to borrow foreign currency against its receivables, sell the foreign currency spot and invest the proceeds in the foreign currency say dollars. Interest rate parity theory tells us that in free market the difference between selling forward and selling spot should be exactly equal to difference between the interest on the money one has to pay overseas and the interest one earns from dollars.

Question 2

"Operations in foreign exchange market are exposed to a number of risks." Discuss.

Answer

A firm dealing with foreign exchange may be exposed to foreign currency exposures. The exposure is the result of possession of assets and liabilities and transactions denominated in foreign currency. When exchange rate fluctuates, assets, liabilities, revenues, expenses that have been expressed in foreign currency will result in either foreign exchange gain or loss. A firm dealing with foreign exchange may be exposed to the following types of risks:

- (i) **Transaction Exposure:** A firm may have some contractually fixed payments and receipts in foreign currency, such as, import payables, export receivables, interest payable on foreign currency loans etc. All such items are to be settled in a foreign currency. Unexpected fluctuation in exchange rate will have favourable or adverse impact on its cash flows. Such exposures are termed as transactions exposures.
- (ii) **Translation Exposure:** The translation exposure is also called accounting exposure or balance sheet exposure. It is basically the exposure on the assets and liabilities shown in the balance sheet and which are not going to be liquidated in the near future. It refers to the probability of loss that the firm may have to face because of decrease in value of assets due to devaluation of a foreign currency despite the fact that there was no foreign exchange transaction during the year.
- (iii) **Economic Exposure:** Economic exposure measures the probability that fluctuations in foreign exchange rate will affect the value of the firm. The intrinsic value of a firm is calculated by discounting the expected future cash flows with appropriate discounting rate. The risk involved in economic exposure requires measurement of the effect of fluctuations in exchange rate on different future cash flows.

Question 3

Distinguish between Caps and Collars.

Answer

Caps and Collars: These are derivatives which a finance manager can use to manage his cash-flows effectively and also to reduce the risk involved in case of a major devaluation of currency.

Caps-if a company decides on a particular rate of a currency vis-à-vis the rupee over which it is not ready to take a risk, it can buy a cap at that rate. The cost of caps is very prohibitive and can be offset by selling a 'floor' which is just the opposite of cap. **Collar** – a combination of caps and floors is called collar.

Question 4

The following table shows interest rates for the United States dollar and French francs. The spot exchange rate is 7.05 francs per dollars. Complete the missing entries:

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	3 Months	6 Months	1 Year
<i>Dollar interest rate</i>			
(annually compounded)	11½%	12¼%	?
<i>Franc interest rate</i>			
(annually compounded)	19½	?	20%
<i>Forward franc per dollar</i>	?	?	7.5200
<i>Forward discount per franc</i>			
per cent per year	?	- 6.3%	

Answer

Computation of Missing Entries in the Table

For computing the missing entries in the table we will use interest rates parity theorem (IRP). This theorem states that the exchange rate of two countries will be affected by their interest rate differential. In other words, the currency of one country with a lower interest rate should be at a forward premium in terms of currency of country with higher interest rates and vice versa. This implies that the exchange rate (forward and spot) differential will be equal to the interest rate differential between the two countries i.e.

Interest rate differential = Exchange rate differential

$$\text{or } \frac{(1+r_f)}{(1+r_d)} = \frac{S_{f/d}}{F_{f/d}}$$

Where r_f is the rate of interest of country F (say the foreign country), r_d is rate of interest of country D (say domestic country), $S_{f/d}$ is the spot rate between the two countries F and D and $F_{f/d}$ is the forward rate between the two countries F and D.

3 months

$$\text{Dollar interest rate} = 11\frac{1}{2}\%$$

(annually compounded)

$$\text{Franc interest rate} = 19\frac{1}{2}\%$$

(annually compounded)

Now, Differential in interest rate = Differential between forward and spot rate

i.e. $\frac{1+.115}{1+.195}$ = Differential between forward and spot rate

Or Differential between forward and spot rate = 93.3%

Therefore, Forward discount on franc per cent per year = 100% - 93.3%
= - 6.7%

Forward discount on franc per cent for 3 months = - 6.7/4 or - 1.675%

Forward franc = Today's spot rate (Difference between forward and Spot rate)
= 0.141844 dollar (100% - 1.675%)

Forward franc = 0.1394681 dollar

Forward franc per dollar = 1/.1394681
= 7.17

6 months

Dollar interest rate = $12\frac{1}{4}\%$

(annually compounded)

Forward discount on franc % per year = - 6.3% or - 3.15% for 6 months

Hence 6 months Forward rate = 0.141844 dollar (Spot rate) (100% - 3.15%)
= 0.13737 dollars

Forward francs per dollar = 1/0.13737

or Forward francs per dollar = 7.28 francs

Again, Differential in interest rate = Differential between forward
between the two countries and spot rate

Now, $\frac{1+\text{Dollar interest rate}}{1+\text{Franc interest rate}}$ = Differential between forward and spot rate

Or $\frac{1+.1225}{1+\text{Franc interest rate}}$ = (100% - 6.3%)

Or $\frac{1+.1225}{1+\text{Franc interest rate}}$ = 93.7%

Or $1+\text{Franc interest rate} = \frac{1.1225}{93.7\%}$

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Or Franc interest rate = 1.19797 – 1

Or = .19797

Or = 19.8%

1 Year

Franc interest rate = 20%

(annually compounded)

Forward franc per dollar = 7.5200

Today's spot rate is 7.05 (given) francs per dollar i.e. 1 Franc = 0.141844 dollar

Forward francs is 7.52 francs per dollar i.e. franc = 0.132978 dollar

Difference 0.008866 dollar

Forward discount on Francs per cent per year = $\frac{0.008866}{0.141844} \times 100$

= - 6.25% or - 6.3%

(rounded off)

Again, Differential in interest rates = Differential between forward

Between the two countries rate and spot rate

i.e. $\frac{1 + \text{Dollar interest rate}}{1 + 0.20} = \frac{7.05}{7.52}$

Or Dollar interest rate = 1.20 × 0.9374 – 1

= 1.125 – 1

= 0.125 or 12.5%

Question 5

Shoe Company sells to a wholesaler in Germany. The purchase price of a shipment is 50,000 deutsche marks with term of 90 days. Upon payment, Shoe Company will convert the DM to dollars. The present spot rate for DM per dollar is 1.71, whereas the 90-day forward rate is 1.70.

You are required to calculate and explain:

- (i) *If Shoe Company were to hedge its foreign-exchange risk, what would it do? What transactions are necessary?*
- (ii) *Is the deutsche mark at a forward premium or at a forward discount?*

(iii) What is the implied differential in interest rates between the two countries?

(Use interest-rate parity assumption).

Answer

- (i) If Shoe Company were to hedge its foreign exchange risk, it would enter into forward contract of selling deutsche marks 90 days forward. It would sell 50,000 deutsche marks 90 days forward. Upon delivery of 50,000 DM 90 days hence, it would receive US \$ 29,412 i.e. 50,000 DM/1.70. If it were to receive US \$ payment today it would receive US \$ 29,240 i.e. 50,000 DM/1.71. Hence, Shoe Company will be better off by \$ 172 if it hedges its foreign exchange risk.
- (ii) The deutsche mark is at a forward premium. This is because the 90 days forward rate of deutsche marks per dollar is less than the current spot rate of deutsche marks per dollar. This implies that deutsche mark is expected to be strengthen i.e. Fewer deutsche mark will be required to buy dollars.
- (iii) The interest rate parity assumption is that high interest rates on a currency are offset by forward discount and low interest rate on a currency is offset by forward premiums.

Further, the spot and forward exchange rates move in tandem, with the link between them based on interest differential. The movement between two currencies to take advantage of interest rates differential is a major determinant of the spread between forward and spot rates. The forward discount or premium is approximately equal to interest differential between the currencies i.e.

$$\frac{F_{(DM/US\$)} - S_{(DM/US\$)}}{S_{(DM/US\$)}} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

$$\text{or } \frac{1.70 - 1.71}{1.71} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

$$\text{Or } -0.0237 = r_{DM} - r_{US\$}$$

Therefore, the differential in interest rate is -2.37%, which means if interest rate parity holds, interest rate in the US should be 2.37% higher than in Germany.

Question 6

Airlines Company entered into an agreement with Airbus for buying latest plans for a total value of F.F. (French Francs) 1,000 Million payable after 6 months. The current spot exchange rate is INR (Indian Rupees) 6.60/FF. The Airlines Company cannot predict the exchange rate in the future. Can the Airlines Company hedge its Foreign Exchange risk? Explain by examples.

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Answer

Airlines Company can hedge its foreign exchange risk by the following ways:

- (i) **Hedging through Forward Contract:** The Company can take full forward cover against foreign exchange exposure and entirely hedge its risk. It can contract with a bank to buy French franc forward at an agreed exchange rate e.g. suppose the 6 months forward rate is INR 6.77/FF. The liability is fixed and the airlines can concentrate on operation. Cost of forward contract

$$= \frac{6.60 - 6.77}{6.60} \times \frac{360}{\text{days}}$$

- (ii) **Foreign Currency Option:** Foreign currency option is the right (not an obligation) to buy or sell a currency at an agreed exchange rate (exercise price) on or before an agreed maturity period. The right to buy is called a call option and right to sell is put option. Suppose, the airlines wants to purchase a 6 months put option. The put option exercise rate (say) is INR 6.70. The Airlines will be required to pay a premium for purchasing the option say 5% of the value of put option INR 6700 × 0.05 = INR 335

Maximum final cost = 6700 + 335 = INR 7035

Suppose at the end of 6 months the exchange rate stay at INR 6.8/FF

Airlines will exercise its put option hence it will sell (pay) INR 6.7

The exercise price to obtain one French Franc in this market, it will be required to pay INR 6.80.

Suppose exchange rate at the end of 6 months is INR 6.35, Airlines should not exercise its option. In the open market it need to pay only INR 6.35 (instead of INR 6.70) to buy one FF. However, it has already paid the option premium.

- (iii) **Money Market Operations:** Airlines can borrow FF 1000 million now, convert them into rupee at the current exchange rate and involve (invest) in money market in India for 6 months. If interest rate parity holds, the difference in the forward rate and the spot rate is the reflection of the difference in the interest rates in two countries. Thus Airlines will be able to hedge against the changes in the exchange rate. The problem with money market is that all markets are not open and all countries are not fully convertible.

Question 7

A customer with whom the Bank had entered into 3 months' forward purchase contract for Swiss Francs 10,000 at the rate of Rs. 27.25 comes to the bank after 2 months and

requests cancellation of the contract. On this date, the rates, prevailing, are:

Spot	CHF 1 =	Rs. 27.30	27.35
One month forward		Rs. 27.45	27.52

What is the loss/gain to the customer on cancellation?

Answer

The contract would be cancelled at the one month forward sale rate of Rs. 27.52.

	Rs.
Francs bought from customer under original forward contract at:	27.25
It is sold to him on cancellation at:	<u>27.52</u>
Net amount payable by customer per Franc	<u>0.27</u>

At Rs. 0.27 per Franc, exchange difference for CHF 10,000 is Rs. 2,700.

Loss to the Customer:

Exchange difference (Loss) Rs. 2,700

Note: The exchange commission and other service charges are ignored.

Question 8

- (a) On 1st April, 3 months interest rate in the US and Germany are 6.5 per cent and 4.5 per cent per annum respectively. The \$/DM spot rate is 0.6560. What would be the forward rate for DM for delivery on 30th June?
- (b) In International Monetary Market an international forward bid for December, 15 on pound sterling is \$ 1.2816 at the same time that the price of IMM sterling future for delivery on December, 15 is \$ 1.2806. The contract size of pound sterling is £ 62,500. How could the dealer use arbitrage in profit from this situation and how much profit is earned?

Answer

(a)	USD	DM
Spot	0.6560	1.000
Interest rate p.a.	6.5%	4.5%
Interest for 91 days	0.0106	0.0112
Amount after 91 days	0.6666	1.0112
Hence forward rate	<u>0.6666</u>	0.6592
	1.0112	

Strategic Financial Management

OR

$$\text{Forward rate} = \frac{0.6560 \left(1 + \frac{0.065}{365} \right)}{\left(1 + \frac{0.045}{365} \right)} = 0.6592$$

- (b) Buy £ 62500 × 1.2806 = \$ 80037.50
 Sell £ 62500 × 1.2816 = \$ 80100.00
 Profit \$ 62.50

Alternatively if the market comes back together before December 15, the dealer could unwind his position (by simultaneously buying £ 62,500 forward and selling a futures contract. Both for delivery on December 15) and earn the same profit of \$ 62.5.

Question 9

In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

\$/Pound	Probability
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

- (i) What is the expected spot rate for 1.9.2009?
 (ii) If, as of March, 2009, the 6-month forward rate is \$ 1.80, should the firm sell forward its pound receivables due in September, 2009?

Answer

- (i) Calculation of expected spot rate for September, 2009:

\$ for £	Probability	Expected \$/£
(1)	(2)	(1) × (2) = (3)
1.60	0.15	0.24

1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38
2.00	<u>0.20</u>	<u>0.40</u>
	<u>1.00</u>	EV = <u>1.81</u>

Therefore, the expected spot value of \$ for £ for September, 2009 would be \$ 1.81.

- (ii) If the six-month forward rate is \$ 1.80, the expected profits of the firm can be maximised by retaining its pounds receivable.

Question 10

ABC Co. have taken a 6 month loan from their foreign collaborators for US Dollars 2 millions. Interest payable on maturity is at LIBOR plus 1.0%. Current 6-month LIBOR is 2%.

Enquiries regarding exchange rates with their bank elicits the following information:

Spot USD 1	Rs. 48.5275
6 months forward	Rs. 48.4575

- (i) What would be their total commitment in Rupees, if they enter into a forward contract?
- (ii) Will you advise them to do so? Explain giving reasons.

Answer

Firstly, the interest is calculated at 3% p.a. for 6 months. That is:

$$\text{USD } 20,00,000 \times 3/100 \times 6/12 = \text{USD } 30,000$$

From the forward points quoted, it is seen that the second figure is less than the first, this means that the currency is quoted at a discount.

- (i) The value of the total commitment in Indian rupees is calculated as below:

Principal Amount of loan	USD 20,00,000
Add: Interest	USD 30,000
Amount due	USD 20,30,000
Spot rate	Rs. 48.5275
Forward Points (6 months)	(-) 0.0700
Forward Rate	Rs. 48.4575
Value of Commitment	Rs. 9,83,68,725

Strategic Financial Management

- (ii) It is seen from the forward rates that the market expectation is that the dollar will depreciate. If the firm's own expectation is that the dollar will depreciate more than what the bank has quoted, it may be worthwhile not to cover forward and keep the exposure open.

If the firm has no specific view regarding future dollar price movements, it would be better to cover the exposure. This would freeze the total commitment and insulate the firm from undue market fluctuations. In other words, it will be advisable to cut the losses at this point of time.

Given the interest rate differentials and inflation rates between India and USA, it would be unwise to expect continuous depreciation of the dollar. The US Dollar is a stronger currency than the Indian Rupee based on past trends and it would be advisable to cover the exposure.

Question 11

A company operating in Japan has today effected sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is 108 lakhs yen. At today's spot rate, it is equivalent to Rs. 30 lakhs. It is anticipated that the exchange rate will decline by 10% over the 3 months period and in order to protect the yen payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 months forward rate is presently quoted as 3.3 yen per rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

Answer

Spot rate of Re. 1 against yen = $108 \text{ lakhs yen} / \text{Rs. } 30 \text{ lakhs} = 3.6 \text{ yen}$

3 months forward rate of Re. 1 against yen = 3.3 yen

Anticipated decline in Exchange rate = 10%.

Expected spot rate after 3 months = $3.6 \text{ yen} - 10\% \text{ of } 3.6 = 3.6 - 0.36 = 3.24 \text{ yen per rupee}$

Rs. (in lakhs)

Present cost of 108 lakhs yen	30
Cost after 3 months: $108 \text{ lakhs yen} / 3.24 \text{ yen}$	<u>33.33</u>
Expected exchange loss	<u>3.33</u>

If the expected exchange rate risk is hedged by a Forward contract:

Present cost	30
Cost after 3 months if forward contract	

is taken 108 lakhs yen/ 3.3 yen	<u>32.73</u>
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Expected loss	<u>2.73</u>
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Suggestion: *If the exchange rate risk is not covered with forward contract, the expected exchange loss is Rs. 3.33 lakhs. This could be reduced to Rs. 2.73 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.*

Question 12

The following data relates to ABC Ltd.'s share prices:

Current price per share	Rs. 180
-------------------------	---------

Price per share in the futures market-6 months	Rs. 195
--	---------

It is possible to borrow money in the market for securities transactions at the rate of 12% per annum.

Required:

- (i) *Calculate the theoretical minimum price of a 6 month-forward contract.*
- (ii) *Explain if any arbitraging opportunities exist.*

Answer

- (i) Calculation of theoretical minimum price of a 6 months forward contract

Theoretical Minimum price = $180 + (180 \times .12 \times 6/12) = \text{Rs. } 190.80$

- (ii) Existence of Arbitrage Opportunity

The arbitrageur can borrow money @ 12% for 6 months and buy the share at Rs. 180. At the same time he can sell the shares in the futures market at Rs. 195. On the expiry date, 6 months later, he could deliver the share and collect Rs. 195, pay off Rs. 190.80 and record a profit of Rs. 4.20.

Question 13

The United States Dollar is selling in India at Rs. 45.50. If the interest rate for a 6-months borrowing in India is 8% per annum and the corresponding rate in USA is 2%.

- (i) *Do you expect United States Dollar to be at a premium or at discount in the Indian forward market?*
- (ii) *What is the expected 6-months forward rate for United States Dollar in India; and*
- (iii) *What is the rate of forward premium or discount?*

Strategic Financial Management

Answer

- (i) Under the given circumstances, the USD is expected to quote at a premium in India as the interest rate is higher in India.

- (ii) Calculation of the forward rate:

$$\frac{1+R_h}{1+R_f} = \frac{F_1}{E_0}$$

Where: R_h is home currency interest rate, R_f is foreign currency interest rate, F_1 is end of the period forward rate, and E_0 is the spot rate.

$$\text{Therefore } \frac{1+(0.08/2)}{1+(0.02/2)} = \frac{F_1}{45.50}$$

$$\frac{1+0.04}{1+0.01} = \frac{F_1}{45.50}$$

$$\text{or } \frac{(1.04)}{1.01} \times 45.50 = F_1$$

$$\text{or } \frac{47.32}{1.01} = F_1$$

$$\text{or } F_1 = 46.85$$

- (iii) Rate of premium:

$$\frac{46.85 - 45.50}{45.50} \times \frac{12}{6} \times 100 = 5.93\%$$

Question 14

Which position on the index future gives a speculator, a complete hedge against the following transactions:

- (i) *The share of Right Limited is going to rise. He has a long position on the cash market of Rs. 50 lakhs on the Right Limited. The beta of the Right Limited is 1.25.*
- (ii) *The share of Wrong Limited is going to depreciate. He has a short position on the cash market of Rs. 25 lakhs on the Wrong Limited. The beta of the Wrong Limited is 0.90.*
- (iii) *The share of Fair Limited is going to stagnant. He has a short position on the cash market of Rs. 20 lakhs of the Fair Limited. The beta of the Fair Limited is 0.75.*

Answer

Sl. No.	Company Name	Trend	Amount (Rs.)	Beta	Index Value (Rs.)	Position
(i)	Right Ltd.	Rise	50 lakh	1.25	62,50,000	Short
(ii)	Wrong Ltd.	Depreciate	25 lakh	0.90	22,50,000	Long
(iii)	Fair Ltd.	Stagnant	20 lakh	0.75	<u>15,00,000</u>	Long
					<u>25,00,000</u>	Short

Question 15

Excel Exporters are holding an Export bill in United States Dollar (USD) 1,00,000 due 60 days hence. They are worried about the falling USD value which is currently at Rs. 45.60 per USD. The concerned Export Consignment has been priced on an Exchange rate of Rs. 45.50 per USD. The Firm's Bankers have quoted a 60-day forward rate of Rs. 45.20.

Calculate:

- (i) Rate of discount quoted by the Bank
(ii) The probable loss of operating profit if the forward sale is agreed to.

Answer

- (i) Rate of discount quoted by the bank

$$= \frac{(45.20 - 45.60) \times 365 \times 100}{45.20 \times 60} = 5.38\%$$

- (ii) Probable loss of operating profit:

$$(45.20 - 45.50) \times 1,00,000 = \text{Rs. } 30,000$$

Question 16

A customer with whom the Bank had entered into 3 months forward purchase contract for Swiss Francs 1,00,000 at the rate of Rs. 36.25 comes to the bank after two months and requests cancellation of the contract. On this date, the rates are:

Spot	CHF 1 = Rs. 36.30	36.35
One month forward	36.45	36.52

Determine the amount of Profit or Loss to the customer due to cancellation of the contract.

Strategic Financial Management

Answer

Original contract for Swiss Francs 1,00,000 @ 36.25 - amount receivable by the customer. To cancel the purchase contract 1 month before the due date - The contract will be cancelled at 1 month forward sale rate i.e. Swiss Francs 1 = 36.52 payable by the customer.

Hence, Swap profit / loss to the customer:

Rs. 36.52	payable by the customer
Rs. 36.25	receivable by the customer
Rs. 0.27	Net payable by the customer i.e. loss

Therefore, total loss to the customer is

Swiss Francs 1,00,000 × Rs. 0.27 = Rs. 27,000

Question 17

On January 28, 2010 an importer customer requested a bank to remit Singapore Dollar (SGD) 25,00,000 under an irrevocable LC. However, due to bank strikes, the bank could effect the remittance only on February 4, 2010. The interbank market rates were as follows:

	January, 28	February 4
Bombay US\$1	= Rs. 45.85/45.90	45.91/45.97
London Pound 1	= US\$ 1.7840/1.7850	1.7765/1.7775
Pound 1	= SGD 3.1575/3.1590	3.1380/3.1390

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or lose due to the delay?

(Calculate rate in multiples of .0001)

Answer

On January 28, 2010 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US \$	=	Rs. 45.90
Pound 1	=	US\$ 1.7850
Pound 1	=	SGD 3.1575
Therefore, SGD 1	=	$\frac{\text{Rs. } 45.90 \times 1.7850}{\text{SGD } 3.1575}$

SGD 1 = Rs. 25.9482

Add: Exchange margin (0.125%) Rs. 0.0324
Rs. 25.9806

On February 4, 2010 the rates are

US \$ = Rs. 45.97

Pound 1 = US\$ 1.7775

Pound 1 = SGD 3.1380

Therefore, SGD 1 = $\frac{\text{Rs. } 45.97 \times 1.7775}{\text{SGD } 3.1380}$

SGD 1 = Rs. 26.0394

Add: Exchange margin (0.125%) Rs. 0.0325
Rs. 26.0719

Hence, loss to the importer

= SGD 25,00,000 (Rs.26.0719 – Rs.25.9806)

= Rs. 2,28,250

Question 18

You as a dealer in foreign exchange have the following position in Swiss Francs on 31st October, 2009:

	Swiss Francs
<i>Balance in the Nostro A/c Credit</i>	1,00,000
<i>Opening Position Overbought</i>	50,000
<i>Purchased a bill on Zurich</i>	80,000
<i>Sold forward TT</i>	60,000
<i>Forward purchase contract cancelled</i>	30,000
<i>Remitted by TT</i>	75,000
<i>Draft on Zurich cancelled</i>	30,000

What steps would you take, if you are required to maintain a credit Balance of Swiss Francs 30,000 in the Nostro A/c and keep as overbought position on Swiss Francs 10,000?

Strategic Financial Management

Answer

Exchange Position/Currency Position:

<i>Particulars</i>	<i>Purchase Sw. Fcs.</i>	<i>Sale Sw. Fcs.</i>
Opening Balance Overbought	50,000	
Bill on Zurich	80,000	
Forward Sales – TT		60,000
Cancellation of Forward Contract		30,000
TT Sales		75,000
Draft on Zurich cancelled	<u>30,000</u>	—
	1,60,000	1,65,000
Closing Balance Oversold	<u>5,000</u>	—
	1,65,000	1,65,000

Cash Position (Nostro A/c)

	<i>Credit</i>	<i>Debit</i>
Opening balance credit	1,00,000	—
TT sales	—	75,000
	1,00,000	75,000
Closing balance (credit)	—	25,000
	1,00,000	1,00,000

The Bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro account to Sw. Fcs. 30,000.

This would bring down the oversold position on Sw. Fcs. As Nil.

Since the bank requires an overbought position of Sw. Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

Question 19

You sold Hong Kong Dollar 1,00,00,000 value spot to your customer at Rs. 5.70 & covered yourself in London market on the same day, when the exchange rates were

US\$ 1 = H.K.\$ 7.5880 7.5920

Local inter bank market rates for US\$ were

Spot US\$ 1 = Rs. 42.70 42.85

Calculate cover rate and ascertain the profit or loss in the transaction. Ignore brokerage.

Answer

The bank (Dealer) covers itself by buying from the market at market selling rate.

Rupee – Dollar selling rate	= Rs. 42.85
Dollar – Hong Kong Dollar	= HK \$ 7.5880
Rupee – Hong Kong cross rate	= Rs. 42.85 / 7.5880
	= Rs. 5.6471

Profit / Loss to the Bank

Amount received from customer (1 crore ₹ 5.70)	Rs. 5,70,00,000
Amount paid on cover deal (1 crore ₹ 5.6471)	<u>Rs. 5,64,71,000</u>
Profit to Bank	<u>Rs. 5,29,000</u>

Question 20

Given the following information:

Exchange rate – Canadian dollar 0.665 per DM (spot)

Canadian dollar 0.670 per DM (3 months)

Interest rates – DM 7% p.a.

Canadian Dollar – 9% p.a.

What operations would be carried out to take the possible arbitrage gains?

Answer

In this case, DM is at a premium against the Can\$.

Premium = $[(0.67 - 0.665) / 0.665] \times (12/3) \times 100 = 3.01$ per cent

Interest rate differential = $9 - 7 = 2$ per cent.

Since the interest rate differential is smaller than the premium, it will be profitable to place money in Deutschmarks the currency whose 3-months interest is lower.

The following operations are carried out:

- (i) Borrow Can\$ 1000 at 9 per cent for 3- months;
- (ii) Change this sum into DM at the spot rate to obtain DM
 $= (1000 / 0.665) = 1503.7$

Strategic Financial Management

- (iii) Place DM 1503.7 in the money market for 3 months to obtain a sum of DM

Principal: 1503.70

Add: Interest @ 7% for 3 months = 26.30

Total 1530.00

- (iv) Sell DM at 3-months forward to obtain Can\$ = $(1530 \times 0.67) = 1025.1$

- (v) Refund the debt taken in Can\$ with the interest due on it, i.e.,

Can\$

Principal 1000.00

Add: Interest @9% for 3 months 22.50

Total 1022.50

Net arbitrage gain = $1025.1 - 1022.5 = \text{Can\$ } 2.6$

Question 21

XYZ Ltd. is an export oriented business house based in Mumbai. The Company invoices in customers' currency. Its receipt of US \$ 1,00,000 is due on September 1, 2009.

Market information as at June 1, 2009 is:

Exchange Rates

US \$/Rs.

Spot

0.02140

1 Month Forward

0.02136

3 Months Forward

0.02127

Currency Futures

US \$/Rs.

June

September

Contract size Rs.4,72,000

0.02126

0.02118

Initial Margin

June

Rs.10,000

September

Rs.15,000

Interest Rates in India

7.50%

8.00%

On September 1, 2009 the spot rate US \$/Rs. is 0.02133 and currency future rate is 0.02134. Comment which of the following methods would be most advantageous for XYZ Ltd.

- (a) Using forward contract
- (b) Using currency futures
- (c) Not hedging currency risks.

It may be assumed that variation in margin would be settled on the maturity of the futures contract.

Answer

Receipts using a forward contract = $1,00,000/0.02127$ = Rs.47,01,457

Receipts using currency futures

The number of contracts needed is $(1,00,000/0.02118)/4,72,000 = 10$

Initial margin payable is $10 \times \text{Rs.}15,000 = \text{Rs.}1,50,000$

On September 1 Close at 0.02133

Receipts = $\text{US\$}1,00,000/0.02133$ = 46,88,233

Variation Margin = $[(0.02134 - 0.02118) \times 10 \times 472000/-]/0.02133$

OR $(0.00016 \times 10 \times 472000)/0.02133 = 755.2/0.02133$ 35,406

47,23,639

Less: Interest Cost – $1,50,000 \times 0.08 \times 3/12$ Rs.3,000

Net Receipts Rs.47,20,639

Receipts under different methods of hedging

Forward contract Rs.47,01,457

Futures Rs.47,20,639

No hedge

US\$ $1,00,000/0.02133$ Rs.46,88,233

The most advantageous option would have been to hedge with futures.

Question 22

Spot rate 1 US \$ = Rs.48.0123

180 days Forward rate for 1 US \$ = Rs.48.8190

Annualised interest rate for 6 months – Rupee = 12%

Annualised interest rate for 6 months – US \$ = 8%

Is there any arbitrage possibility? If yes how an arbitrageur can take advantage of the situation, if he is willing to borrow Rs.40,00,000 or US \$83,312.

Answer

Spot Rate = $\text{Rs.}4000000/- /83312 = 48.0123$

Forward Premium on US\$ = $[(48.8190 - 48.0123)/48.0123] \times 12/6 \times 100$

Strategic Financial Management

$$= 3.36\%$$

Interest rate differential = 12% - 8%

$$= 4\% \text{ (Negative Interest rate differential)}$$

Since the negative Interest rate differential is greater than forward premium there is a possibility of arbitrage inflow into India.

The advantage of this situation can be taken in the following manner:

1. Borrow US\$ 83312 for 6 months

Amount to be repaid after 6 months

$$= \text{US \$ } 83312 (1 + 0.08 \times 6/12) = \text{US\$}86644.48$$

2. Convert US\$ 83312 into Rupee and get the principal i.e. Rs.40,00,000

Interest on Investments for 6 months – Rs.4000000/- x 0.06

$$= \text{Rs.}240000/-$$

Total amount at the end of 6 months = Rs.(4000000 + 240000/-)

$$= \text{Rs.}4240000/-$$

Converting the same at the forward rate

$$= \text{Rs.}4240000/- / \text{Rs.}48.8190 =$$

$$= \text{US\$ } 86851.43$$

Hence the gain is US \$ (86851.43 – 86644.48) = US\$ 206.95 OR

Rs.10103 i.e., (\$206.95 x Rs.48.8190)

Question 23

Following are the details of cash inflows and outflows in foreign currency denominations of MNP Co. an Indian export firm, which have no foreign subsidiaries:

Currency	Inflow	Outflow	Spot rate	Forward rate
US \$	4,00,00,000	2,00,00,000	48.01	48.82
French Franc (FFr)	2,00,00,000	80,00,000	7.45	8.12
U.K. £	3,00,00,000	2,00,00,000	75.57	75.98
Japanese Yen	1,50,00,000	2,50,00,000	3.20	2.40

- (i) Determine the net exposure of each foreign currency in terms of Rupees.
- (ii) Are any of the exposure positions offsetting to some extent?

Answer

(i) Net exposure of each foreign currency in Rupees

	Inflow (Millions)	Outflow (Millions)	Net Inflow (Millions)	Spread	Net Exposure (Millions)
US\$	40	20	20	0.81	16.20
FFr	20	8	12	0.67	8.04
UK£	30	20	10	0.41	4.10
Japan Yen	15	25	-10	-0.80	8.00

(ii) The exposure of Japanese yen position is being offset by a better forward rate

Question 24*AMK Ltd. an Indian based company has subsidiaries in U.S. and U.K.**Forecasts of surplus funds for the next 30 days from two subsidiaries are as below:*U.S. \$12.5 millionU.K. £ 6 million*Following exchange rate information is obtained:*

	\$/Rs.	£/Rs.
Spot	0.0215	0.0149
30 days forward	0.0217	0.0150

*Annual borrowing/deposit rates (Simple) are available.*Rs. 6.4%/6.2%\$ 1.6%/1.5%£ 3.9%/3.7%*The Indian operation is forecasting a cash deficit of Rs.500 million.**It is assumed that interest rates are based on a year of 360 days.*

(i) Calculate the cash balance at the end of 30 days period in Rs. for each company under each of the following scenarios ignoring transaction costs and taxes:

(a) Each company invests/finances its own cash balances/deficits in local currency independently.

Strategic Financial Management

(b) Cash balances are pooled immediately in India and the net balances are invested/borrowed for the 30 days period.

(ii) Which method do you think is preferable from the parent company's point of view?

Answer

Cash Balances:

Acting independently

	<u>Capital</u>	<u>Interest</u>	<u>Rs. in 30 days</u>
India	-5,00,000	-2,666.67	-5,02,667
U.S.	12,500	15.63	5,76,757
U.K.	6,000	18.50	4,01,233
			<u>4,75,323</u>

Cash Balances:-

Immediate Cash pooling

	<u>Rs.</u>
India	- 5,00,000
U.S. $\frac{12,500}{0.0215} =$	5,81,395
U.K. $\frac{6,000}{0.0149} =$	4,02,685
	<u>4,84,080</u>

Immediate cash pooling is preferable as it maximizes interest earnings

Note: If the company decides to invest pooled amount of Rs.4,84,080/- @ 6.2% p.a. for 30 days an interest of Rs.2,501/- will accrue.

Question 25

Following information relates to AKC Ltd. which manufactures some parts of an electronics device which are exported to USA, Japan and Europe on 90 days credit terms.

Cost and Sales information:

	<u>Japan</u>	<u>USA</u>	<u>Europe</u>
Variable cost per unit	Rs.225	Rs.395	Rs.510

Foreign Exchange Exposure and Risk Management

Export sale price per unit	Yen 650	US\$10.23	Euro 11.99
Receipts from sale due in 90 days	Yen 78,00,000	US\$1,02,300	Euro 95,920

Foreign exchange rate information:

	Yen/Rs.	US\$/Rs.	Euro/Rs.
Spot market	2.417-2.437	0.0214-0.0217	0.0177-0.0180
3 months forward	2.397-2.427	0.0213-0.0216	0.0176-0.0178
3 months spot	2.423-2.459	0.02144-0.02156	0.0177-0.0179

Advice AKC Ltd. by calculating average contribution to sales ratio whether it should hedge it's foreign currency risk or not.

Answer

If foreign exchange risk is hedged

				Total (Rs.)
Sum due	Yen 78,00,000	US\$1,02,300	Euro 95,920	
Unit input price	Yen 650	US\$10.23	Euro 11.99	
Unit sold	12000	10000	8000	
Variable cost per unit	Rs.225/-	395	510	
Variable cost	Rs.27,00,000	Rs.39,50,000	Rs.40,80,000	Rs.1,07,30,000
Three months forward rate for selling	2.427	0.0216	0.0178	
Rupee value of receipts	Rs.32,13,844	Rs.47,36,111	Rs.53,88,764	Rs.1,33,38,719
Contribution	Rs.5,13,844	Rs.7,86,111	Rs.13,08,764	Rs.26,08,719
Average contribution to sale ratio				19.56%
If risk is not hedged				
Rupee value of receipt	Rs.31,72,021	Rs.47,44,898	Rs.53,58,659	Rs.1,32,75,578
Total contribution				Rs.25,45,578

Strategic Financial Management

Average contribution to sale ratio 19.17%

AKC Ltd. Is advised to hedge its foreign currency exchange risk.

Question 26

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st. January, 2008 for which it has to make a payment of US \$ 50,000 on September 30, 2008. The present exchange rate is 1 US \$ = Rs. 40. It can purchase forward 1 US \$ at Rs. 39. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 10% per annum and the rate of corporate tax is 50%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:

- (i) *If the exchange rate on September 30, 2008 is Rs. 42 per US \$.*
- (ii) *If the exchange rate on September 30, 2008 is Rs. 38 per US \$.*

Answer

	(Rs.)
Present Exchange Rate Rs.40 = 1 USD	
If company purchases USD 50000 forward premium is	
$50000 \times 39 \times 2\%$	39,000
Interest on Rs.39,000 for 9 months at 10%	2,925
Total hedging cost	41,925
If exchange rate is Rs.42	
Then gain (Rs.42 – 39) for USD 50000	1,50,000
Less: Hedging cost	41,925
Net gain	1,08,075
If USD = Rs.38	
Then loss (39 – 38) for USD 50000	50,000
Add: Hedging Cost	41,925
Total Loss	91,925

Question No. 27

Sun Ltd. is planning to import equipment from Japan at a cost of 3,400 lakh yen. The company may avail loans at 18 percent per annum with quarterly rests with which it can

import the equipment. The company has also an offer from Osaka branch of an India based bank extending credit of 180 days at 2 percent per annum against opening of an irrecoverable letter of credit.

Additional information:

Present exchange rate $\text{Rs.100} = 340 \text{ yen}$

180 day's forward rate $\text{Rs.100} = 345 \text{ yen}$

Commission charges for letter of credit at 2 per cent per 12 months.

Advise the company whether the offer from the foreign branch should be accepted.

Answer

Option I (To finance the purchases by availing loan at 18% per annum):

Cost of equipment		<i>Rs. in lakhs</i>
3400 lakh yen at $\text{Rs.100} = 340 \text{ yen}$	=	1000
Add: Interest at 4.5% I Quarter	=	45
Add: Interest at 4.5% II Quarter	=	47.03
(on Rs.1045 lakhs)		
Total outflow in Rupees	=	1092.03
Alternatively, interest may also be calculated on compounded basis, i.e.,		
$\text{Rs.1000} \times [1.045]^2$	=	Rs.1092.03

Option II (To accept the offer from foreign branch):

Cost of letter of credit		<i>Rs. in lakhs</i>
At 1 % on 3400 lakhs yen at $\text{Rs.100} = 340 \text{ yen}$	=	10.00
Add: Interest I Quarter	=	0.45
Add: Interest II Quarter	=	0.47
(A)	=	10.92

Payment at the end of 180 days:

Cost	3400.00 lakhs yen	
Interest at 2% p.a. $[3400 \times 2/100 \times 180/365]$	33.53 lakhs yen	
	3433.53 lakhs yen	
Conversion at $\text{Rs.100} = 345 \text{ yen}$ $[3433.53 / 345 \times 100]$ (B)		= Rs.995.23

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Total Cost: $A + B = 1006.15$ lakhs

Advise: Option no.2 is cheaper by $(1092.03 - 1006.15)$ lakh or 85.88 lakh. Hence, the offer may be accepted.

Question 28

Followings are the spot exchange rates quoted at three different forex markets:

USD/INR	48.30 in Mumbai
GBP/INR	77.52 in London
GBP/USD	1.6231 in New York

The arbitrageur has USD1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

Answer

The arbitrageur can proceed as stated below to realize arbitrage gains.

- (i) Buy I. Rs. from USD 10,000,000
- | | |
|-----------|--------------------------|
| At Mumbai | $48.3 \times 10,000,000$ |
| | Rs.483,000,000 |
- (ii) Convert I. Rs. to GBP at London
- | | |
|-------|-----------------------------|
| | $\frac{483,000,000}{77.52}$ |
| GBP = | 6,230,650.155 |
- (iii) Convert GBP to USD at New York
- | | |
|-------|-------------------------------|
| | $6,230,650.155 \times 1.6231$ |
| USD = | 10,112,968.26 |
- There is net gain of USD = 10,112,968.26 less 10,000,000
i.e USD = 112,968.26

Question 29

XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:

Spot rate 1 £ = \$ 2.00

180 days forward rate of £ as of today = \$1.96

Interest rates are as follows:

	U.K.	US
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of \$ 1.97 and a premium of \$ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	Probability
\$ 1.91	25%
\$ 1.95	60%
\$ 2.05	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

- (a) A forward contract;
- (b) A money market hedge;
- (c) An option contract;
- (d) No hedging.

Show calculations in each case

Answer

(a) Forward contract: Dollar needed in 180 days = £3,00,000 x \$ 1.96 = \$5,88,000/-

(b) Money market hedge: Borrow \$, convert to £, invest £, repay \$ loan in 180 days

Amount in £ to be invested = $3,00,000 / 1.045 = £ 287,081$

Amount of \$ needed to convert into £ = $2,87,081 \times 2 = \$ 5,74,162$

Interest and principal on \$ loan after 180 days = $\$5,74,162 \times 1.055 = \$ 6,05,741$

(c) Call option:

Expected Spot rate in 180 days	Prem. /unit	Exercise Option	Total price per unit	Total price for £3,00,000 xi	Prob. Pi	pixi
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01	6,03,000	0.15	90,450
						<u>5,94,900</u>

Strategic Financial Management

(d) No hedge option:

<i>Expected Future spot rate</i>	<i>Dollar needed Xi</i>	<i>Prob. Pi</i>	<i>Pi xi</i>
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			<u>5,86,500</u>

The probability distribution of outcomes for no hedge strategy appears to be most preferable because least number of \$ are needed under this option to arrange £3,00,000.

EXERCISES

Question 1

The current ¥/\$ spot rate is 123.00. 6 month European calls with strike 0.0087 and 0.0083 (\$/¥) are trading at premia of ¢ 0.015/¥ and ¢ 0.02/\$ (cents per yen) respectively. A speculator is expecting a fairly strong appreciation of the yen over the next six months. What option strategy should he adopt to profit from this forecast? What is the breakeven rate? How much is the maximum possible profit? Ignore brokerage fees and interest costs/gains.

(Answer: 0.035 cent per yen)

Question 2

(b) If the interest rate for the next 6 months for the US\$ is 1.5% (annual compounding). The interest rate for the € is 2% (annual compounding). The spot price of the € is US \$ 1.665. The forward price is expected to be US\$ 1.664. Please determine correct forward price and recommend an arbitrage strategy.

(Answer: 1.6568)

Question 3

On 30th June 2009 when a forward contract matured for execution you are asked by an importer customer to extend the validity of the forward sale contract for US\$ 10,000 for a further period of three months.

Contracted Rate US\$1 = Rs.41.87

The US Dollar quoted on 30.6.2009

Spot	Rs. 40.4800/Rs. 40.4900
Premium July	0.1100/0.1300
Premium August	0.2300/0.2500
Premium September	0.3500/0.3750

Calculate the cost for your customer in respect of the extension of the forward contract. Rupee values to be rounded off to the nearest Rupee.

Margin 0.080% for Buying Rate

Margin 0.25% for Selling Rate

(Answer: Rs. 14,200/-)

Question 4

Wenden Co is a Dutch-based company which has the following expected transactions:

One month: Expected receipt of	£2,40,000
One month: Expected payment of	£1,40,000
Three months: Expected receipts of	£3,00,000

The finance manager has collected the following information:

Spot rate (£ per €):	1.7820 ± 0.0002
One month forward rate (£ per €):	1.7829 ± 0.0003
Three months forward rate (£ per €):	1.7846 ± 0.0004

Money market rates for Wenden Co:

	Borrowing	Deposit
One year Euro interest rate:	4.9%	4.6
One year Sterling interest rate:	5.4%	5.1

Assume that it is now 1 April.

Required:

- (a) Calculate the expected Euro receipts in one month and in three months using the forward market.
- (d) Calculate the expected Euro receipts in three months using a money-market hedge and recommend whether a forward market hedge or a money market hedge should be used.

(Answer: (a) €56,079 and €1,68,067 (b) €167,999 and Market Hedge is preferable)

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Question 5

CQS plc is a UK company that sells goods solely within UK. CQS plc has recently tried a foreign supplier in Netherland for the first time and need to pay €250,000 to the supplier in six months' time. You as financial manager are concerned that the cost of these supplies may rise in Pound Sterling terms and has decided to hedge the currency risk of this account payable. The following information has been provided by the company's bank:

Spot rate (€ per £): 1.998 ± 0.002

Six months forward rate (€ per £): 1.979 ± 0.004

Money market rates available to CQS plc:

Borrowing Deposit

One year Pound Sterling interest rates: 6.1% 5.4%

One year Euro interest rates: 4.0% 3.5%

Assuming CQS plc has no surplus cash at the present time you are required to evaluate whether a money market hedge, a forward market hedge or a lead payment should be used to hedge the foreign account payable.

(Answer: The most expensive hedge is the lead payment, while the cheapest is the forward market hedge and therefore be recommended.)

Question 6

Suppose a dealer quotes 'All-in-cost' for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is Rs.5,00,000,

- (i) Calculate semi-annual fixed payment.
- (ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 181 days and that the corresponding LIBOR was 6% on the effective date of swap.
- (iii) In (ii) above, if the settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer?

Generic swap is based on 30/360 days basis.

(Answer: (i) Rs.20,000/- (ii) Rs.15,090 or 15,083 (iii) Rs. 4,917)

MERGER, ACQUISITION & RESTRUCTURING

BASIC CONCEPTS AND FORMULAE

1. Introduction

The terms 'mergers', 'acquisitions' and 'takeovers' are often used interchangeably in common parlance. However, there are differences. While merger means unification of two entities into one, acquisition involves one entity buying out another and absorbing the same. In India, in legal sense merger is known as 'Amalgamation'.

2. Reconstruction

Reconstruction involves the winding-up of an existing company and transfer of its asset and liabilities to a new company formed to take the place of the existing company. In the result, the same shareholders who agree to take equivalent shares in the new company carry on the same enterprise through the medium of a new company.

3. Amalgamation or Merger

"Generally, where only one company is involved in a scheme and the rights of the shareholders and creditors are varied, it amounts to *reconstruction* or *reorganisation* or *scheme of arrangement*. In an amalgamation, two or more companies are fused into one by merger or by one taking over the other. Amalgamation is a blending of two or more existing undertakings into one undertaking, the shareholders of each blending company become substantially the shareholder of the company which is to carry on the blended undertaking.

4. Types of Mergers

- (a) **Horizontal merger:** The two companies which have merged are in the same industry, normally the market share of the new consolidated company would be larger and it is possible that it may move closer to being a monopoly or a near monopoly.
- (b) **Vertical merger:** It means the merger of two companies which are in different field altogether, the coming together of two concerns may give rise to a situation similar to a monopoly.

Strategic Financial Management

- (c) **Reverse merger-** Where, in order to avail benefit of carry forward of losses which are available according to tax law only to the company which had incurred them, the profit making company is merged with companies having accumulated losses.
- (d) **Conglomerate Mergers-** Such mergers involve firms engaged in unrelated type of business operations. In other words, the business activities of acquirer and the target are not related to each other horizontally (i.e. producing the same or competing products) nor vertically (having relationship of buyer and supplier). In a pure conglomerate merger, there are no important common factors between the companies in production, marketing, research and development and technology.
- (e) **Congeneric Merger-** In these mergers, the acquirer and the target companies are related through basic technologies, production processes or markets. The acquired company represents an extension of product-line, market participants or technologies of the acquirer. These mergers represent an outward movement by the acquirer from its current business scenario to other related business activities.

5. Reasons and Rationale for Mergers and Acquisitions

The most common reasons for Mergers and Acquisition (M&A) are:

- Synergistic operating economies;
- Diversification;
- Taxation;
- Growth; and
- Consolidation of production capacities and increasing market power.

6. Gains from Mergers or Synergy

The first step in merger analysis is to identify the economic gains from the merger. There are gains, if the combined entity is more than the sum of its parts. That is, Combined value > (Value of acquirer + Stand alone value of target).

The difference between the combined value and the sum of the values of individual companies is usually attributed to *synergy*.

Value of acquirer + Stand alone value of target + Value of synergy = Combined value

7. Principal Steps in a Successful M & A Program

- Manage the pre-acquisition phase;

- Screen candidates;
- Eliminate those who do not meet the criteria and value the rest;
- Negotiate; and
- Post-merger integration.

8. Problems for M & A in India

- Indian corporates are largely promoter-controlled and managed.
- In some cases, the need for prior negotiations and concurrence of financial institutions and banks is an added rider, besides SEBI's rules and regulations.
- The reluctance of financial institutions and banks to fund acquisitions directly.
- The BIFR route, although tedious, is preferred for obtaining financial concessions.
- Lack of exit policy for restructuring/downsizing.
- Absence of efficient capital market system makes the market capitalisation not fair in some cases.
- Valuation is still evolving in India.

9. Mergers in Specific Sectors

The Companies Act, 1956 and the SEBI's Takeover Code are the general source of guidelines governing mergers. There are sector specific legislative provisions, which to a limited extent empower the regulator to promote competition. Mergers in the banking sector require approval from the RBI.

10. Acquisitions and Takeover

Acquisition refers to the purchase of controlling interest by one company in the share capital of an existing company. When a company is acquired by another company, the acquiring company has two choices either to merge both the companies into one and function as a single entity and another is to operate the company as an independent entity with changed management and policies. The first one is termed as 'Merger', whereas the second one is known as 'Takeover'.

11. The Evolution of Takeovers, Principles and Enforcement–The Indian Scenario

There are basically two major modes of takeover which are prevalent in India- Takeover through direct negotiations with Financial Institutions and Takeover by acquisition of adequate shareholding. Acquisition or Takeover may be by way of:

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- (i) Acquisition of company's shares.
- (ii) Acquisition of business assets (ABOs).
- (iii) Acquisition of brand's.
- (iv) Acquisition of Companies by Friendly vs. Hostile takeover.
- (v) Reverse acquisition.

12. Takeover Strategies

Other than tender offer, the acquiring company can also use the following techniques:

- **Street Sweep:** It refers to the technique where the acquiring company accumulates large number of shares in a target company before making an open offer.
- **Bear Hug:** When the acquirer threatens the target company to make an open offer, the board of the target company agrees to a settlement with the acquirer for change of control.
- **Strategic Alliance:** This involves disarming the acquirer by offering a partnership rather than a buyout. The acquirer asserts control from within and takes over the target company.
- **Brand Power:** This refers to entering into an alliance with powerful brands to displace the target's brands and as a result, buyout the weakened company.

13. Takeover by Reverse Bid

In a 'reverse takeover', a smaller company gains control of a larger one. The concept of takeover by reverse bid, or of reverse merger, is thus not the usual case of amalgamation of a sick unit which is non-viable with a healthy or prosperous unit but is a case whereby the entire undertaking of the healthy and prosperous company is to be merged and vested in the sick company which is non-viable.

14. The Acquisition Process

The acquisition process involves the following five essential stages:

- (i) Competitive analysis;
- (ii) Search and screen;
- (iii) Strategy development;
- (iv) Financial evaluation; and
- (v) Negotiation.

15. Defending a Company in a Takeover Bid

Due to the prevailing guidelines, the target company without the approval of the shareholder cannot resort to any issuance of fresh capital or sale of assets etc., and also due to the necessity of getting approvals from various authorities. Thus, the target company cannot refuse transfer of shares without the consent of shareholders in a general meeting.

A target company can adopt a number of tactics to defend itself from hostile takeover through a tender offer.

- Divestiture;
- Crown jewels;
- Poison pill;
- Poison Put;
- Greenmail;
- White knight ;
- White squire;
- Golden parachutes ; and
- Pac-man defense.

16. Legal Aspects of M & As

Merger control requirements in India are currently governed by the provisions of the Companies Act, 1956 and the Securities and Exchange Board of India (Substantial Acquisition of Shares and Takeovers) Regulations, 1997. ("the takeover code"). Other statutes which govern merger proposals are the Industries (Development and Regulation) Act, 1951; the Foreign Exchange Management Act, 2000, the Income Tax Act, 1961 and the SEBI Act, 1992.

17. Due Diligence

Due diligence means research. Its purpose in M&A is to support the valuation process, arm negotiators, test the accuracy of representations and warranties contained in the merger agreement, fulfill disclosure requirements to investors, and inform the planners of post-merger integration.

A due diligence process should focus at least on the following issues:

- Legal issues;
- Financial and tax issues;

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- Marketing issues;
- Cross-border issues; and
- Cultural and ethical issues.

18. Target Valuation for M & A

The value of a business is a function of the business logic driving the M&A and is based on bargaining powers of buyers and sellers. Thorough due diligence has to be exercised in deciding the valuation parameters since these parameters would differ from sector to sector and company to company. Some methods of valuation are:

- (a) **Earnings based valuation** (discounted cash-flow being the most common technique) takes into consideration the future earnings of the business and hence the appropriate value depends on projected revenues and costs in future, expected capital outflows, number of years of projection, discounting rate and terminal value of business.
- (b) In a **cost to create** approach, the cost for building up the business from scratch is taken into consideration and the purchase price is typically the cost plus a margin.
- (c) While using the **market based valuation** for unlisted companies, comparable listed companies have to be identified and their market multiples (*such as market capitalizations to sales or stock price to earnings per share*) are used as surrogates to arrive at a value.
- (d) The **asset based value** considers either the book value (assets net liabilities) or the net adjusted value (revalued net assets). If the company has intangible assets like brands, copyrights, intellectual property etc., these are valued independently and added to the net asset value to arrive at the business value.

19. Corporate Restructuring

Restructuring of business is an integral part of modern business enterprises. Restructuring usually involves major organizational changes such as shift in corporate strategies. Restructuring can be internally in the form of new investments in plant and machinery, Research and Development of products and processes, hiving off of non-core businesses, divestment, sell-offs, de-merger etc. Restructuring can also take place externally through mergers and acquisitions (M&A) and by forming joint-ventures and having strategic alliances with other firms. The aspects relating to expansion or contraction of a firm's operations or changes

in its assets or financial or ownership structure are known as corporate restructuring.

20. Reasons for Demerger/Divestment

There are various reasons for divestment or demerger viz.

- (i) To pay attention on core areas of business;
- (ii) The division's/business may not be sufficiently contributing to the revenues;
- (iii) The size of the firm may be too big to handle; and
- (iv) The firm may be requiring cash urgently in view of other investment opportunities.

21. Different Ways of Divestment or Demerger

- (a) **Sell off:** A sell off is the sale of an asset, factory, division, product line or subsidiary by one entity to another for a purchase consideration payable either in cash or in the form of securities.
- (b) **Spin-off:** In this case, a part of the business is separated and created as a separate firm.
- (c) **Split-up:** This involves breaking up of the entire firm into a series of spin off (by creating separate legal entities). The parent firm no longer legally exists and only the newly created entities survive.
- (d) **Carve outs:** This is like spin off however; some shares of the new company are sold in the market by making a public offer, so this brings cash. In carve out, the existing company may sell either majority stake or minority stake, depending upon whether the existing management wants to continue to control it or not.
- (e) **Sale of a Division:** In the case of sale of a division, the seller company is demerging its business whereas the buyer company is acquiring a business.

22. Corporate Controls

- (a) **Going Private:** This refers to the situation wherein a listed company is converted into a private company by buying back all the outstanding shares from the markets.
- (b) **Equity buyback:** This refers to the situation wherein a company buys back its own shares from the market. This results in reduction in the equity capital of the company. This strengthens the promoter's position by increasing his stake in the equity of the company.

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- (c) **Restructuring of an existing business:** It may involve, for instance, downsizing and closing down of some unprofitable departments. May also include trimming the number of personnel.
- (d) **Buy-outs:** This is also known as Management buyouts (MBO). In this case, the management of the company buys a particular part of the business from the firm and then incorporates the same as a separate entity.
- (e) **Management buy-ins:** They are a similar form of transaction but differ in the sense that the entrepreneurs leading the transaction come from outside the company. The Buy-ins is a hybrid form involving both existing and new managements.

23. Financial Restructuring

Financial restructuring refers to a kind of internal changes made by the management in assets and liabilities of a company with the consent of its various stakeholders. This is a suitable mode of restructuring for corporate entities who have suffered from sizeable losses over a period of time. For such firms a plan of restructuring needs to be formulated involving a number of legal formalities (which includes consent of court, and other stake-holders viz., creditors, lenders and shareholders etc.).

24. Merger Failures or Potential Adverse Competitive Effects

The reasons for merger failures can be numerous. Some of the key reasons are:

- Acquirers generally overpay;
- The value of synergy is over-estimated;
- Poor post-merger integration; and
- Psychological barriers.

Most companies merge with the hope that the benefits of synergy will be realised. Synergy will be there only if the merged entity is managed better after the acquisition than it was managed before. Therefore, to make a merger successful, companies may follow the steps listed as under:

- Decide what tasks need to be accomplished in the post-merger period;
- Choose managers from both the companies (and from outside);
- Establish performance yardstick and evaluate the managers on that yardstick; and
- Motivate them.

25. Maximum Purchase Consideration

Maximum purchase consideration is value of vendor's business from the viewpoint of the purchaser. This is given by present value incremental cash flow accruing to the purchaser on acquisition of vendor's business. Some important points to be noted in this regard are:

- The discounting rate represents the rate of return desired from the operating activities.
- The operating cash flow of a business is the aggregate of cash flows generated by the operating assets.
- The acquisition of business can give rise to certain additional liabilities.
- In theory, a business has infinite life. However, in reality it is very difficult to project cash flows to eternity. It is, therefore, usual to assume that the business shall be disposed off after the forecast period. The expected disposal value of the business, called the terminal or horizon value is a cash flow in the terminal year. The present value of terminal value is added with the present value of operating cash flows.

26. Acquiring for Shares

The acquirer can pay the target company in cash or exchange shares in consideration. The analysis of acquisition for shares is slightly different. The steps involved in the analysis are:

Estimate the value of acquirer's (self) equity;

- Estimate the value of target company's equity;
- Calculate the maximum number of shares that can be exchanged with the target company's shares; and
- Conduct the analysis for pessimistic and optimistic scenarios.

Exchange ratio is the number of acquiring firm's shares exchanged for each share of the selling firm's stock. Suppose company A is trying to acquire company B's 100,000 shares at Rs.230. So the cost of acquisition is Rs. 230,00,000. Company A has estimated its value at Rs.200 per share. To get one share of company B, A has to exchange $(230/200)$ 1.15 share, or 115,000 shares for 100,000 shares of B. The relative merits of acquisition for cash or shares should be analysed after giving due consideration to the impact on EPS, capital structure, etc.

27. Impact of Price- Earnings Ratio

The reciprocal of cost of equity is price-earning (P/E) ratio. The cost of equity, and

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consequently the P/E ratio reflects risk as perceived by the shareholders. The risk of merging entities and the combined business can be different. In other words, the combined P/E ratio can very well be different from those of the merging entities. Since market value of a business can be expressed as product of earning and P/E ratio ($P/E \times E = P$), the value of combined business is a function of combined earning and combined P/E ratio. A lower combined P/E ratio can offset the gains of synergy or a higher P/E ratio can lead to higher value of business, even if there is no synergy. In ascertaining the exchange ratio of shares due care should be exercised to take the possible combined P/E ratio into account.

Question 1

Explain the term "Demerger".

Answer

Demerger: The word 'demerger' is defined under the Income-tax Act, 1961. It refers to a situation where pursuant to a scheme for reconstruction/restructuring, an 'undertaking' is transferred or sold to another purchasing company or entity. The important point is that even after demerger; the transferring company would continue to exist and may do business.

Demerger is used as a suitable scheme in the following cases:

- Restructuring of an existing business
- Division of family-managed business
- Management 'buy-out'.

While under the Income tax Act there is recognition of demerger only for restructuring as provided for under sections 391 – 394 of the Companies Act, in a larger context, demerger can happen in other situations also.

Question 2

Explain the term 'Buy-Outs'.

Answer

A very important phenomenon witnessed in the Mergers and Acquisitions scene, in recent times is one of buy - outs. A buy-out happens when a person or group of persons gain control of a company by buying all or a majority of its shares. A buyout involves two entities, the acquirer and the target company. The acquirer seeks to gain controlling interest in the company being acquired normally through purchase of shares. There are two common types of buy-outs: Leveraged Buyouts (LBO) and Management Buy-outs

(MBO). LBO is the purchase of assets or the equity of a company where the buyer uses a significant amount of debt and very little equity capital of his own for payment of the consideration for acquisition. MBO is the purchase of a business by its management, who when threatened with the sale of its business to third parties or frustrated by the slow growth of the company, step-in and acquire the business from the owners, and run the business for themselves. The majority of buy-outs is management buy-outs and involves the acquisition by incumbent management of the business where they are employed. Typically, the purchase price is met by a small amount of their own funds and the rest from a mix of venture capital and bank debt.

Internationally, the two most common sources of buy-out operations are divestment of parts of larger groups and family companies facing succession problems. Corporate groups may seek to sell subsidiaries as part of a planned strategic disposal programme or more forced reorganisation in the face of parental financing problems. Public companies have, however, increasingly sought to dispose of subsidiaries through an auction process partly to satisfy shareholder pressure for value maximisation.

In recessionary periods, buy-outs play a big part in the restructuring of a failed or failing businesses and in an environment of generally weakened corporate performance often represent the only viable purchasers when parents wish to dispose of subsidiaries.

Buy-outs are one of the most common forms of privatisation, offering opportunities for enhancing the performances of parts of the public sector, widening employee ownership and giving managers and employees incentives to make best use of their expertise in particular sectors.

Question 3

What is take over by reverse bid?

Answer

Take Over by Reverse Bid: When the smaller company gains control of a larger one. Then it is called "Take-over by reverse bid". This concept has been successfully followed for revival of sick industries. The concept of take-over by reverse bid, or of reverse merger, is thus not the usual case of amalgamation of a sick unit which is non-viable with a healthy or prosperous unit but is a case whereby the entire undertaking of the healthy and prosperous company is to be merged and vested in the sick company which is non-viable. Under the Sick Industrial Companies (Special Provision) Act, 1985, a company becomes a sick industrial company when there is erosion of its net worth. This alternative is also known as taking over by reverse bid.

The three tests in a takeover by reverse bid that are required to be satisfied are, namely, (i) the assets of the transferor company are greater than the transferee company; (ii)

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equity capital to be issued by the transferee company pursuant to the acquisition exceeds its original issued capital, and (iii) the change of control in the transferee company will be through the introduction of minority holder or group of holders.

In reverse takeover control goes to the shareholders (and usually management) of the company that is formally the target of the bid.

The term reverse takeover is also applied to the purchase of a listed company by an unlisted company with control passing to the shareholders and management of the unlisted company. This is sometimes known as a 'back door listing'.

A reverse takeover will almost always take place by way of a pure equity acquisition, also called a share swap.

A reverse takeover for the purpose of obtaining a back door listing is accomplished by the shareholders of the unlisted company selling all of their shares to the listed company in exchange for shares of the listed company.

This is a cost effective method of obtaining a public listing because it avoids the expenses associated with floatation. Sometimes, the unlisted company usually takes over a listed company; a company i.e., listed but not actively traded on the stock exchange.

Question 4

Company X is contemplating the purchase of Company Y. Company X has 3,00,000 shares having a market price of Rs. 30 per share, while Company Y has 2,00,000 shares selling at Rs. 20 per share. The EPS are Rs. 4.00 and Rs. 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

- (i) In proportion to the relative earnings per share of two companies.*
- (ii) 0.5 share of Company X for one share of Company Y (0.5 : 1).*

You are required:

- (i) To calculate the Earnings Per Share (EPS) after merger under two alternatives; and*
- (ii) To show the impact on EPS for the shareholders of two companies under both the alternatives.*

Answer

- (i) Mergers effect on EPS**

(Exchange ratio in proportion to relative EPS)

(in Rs.)

Company	Existing No. Of shares	EPS	Total earnings
X	3,00,000	4.00	12,00,000
Y	2,00,000	2.25	<u>4,50,000</u>
		Total earnings	<u>16,50,000</u>

No. of shares after merger $3,00,000 + 1,12,500 = 4,12,500$

Note: 1,12,500 may be calculated as $\frac{2,00,000 \times 2.25}{4.00} = 1,12,500$

$$\text{EPS for Co X after merger} = \frac{16,50,000}{4,12,500}$$

$$= \text{Rs. 4.00}$$

Equivalent EPS of Co. Y

Before merger Rs. 2.25

After merger (EPS before merger $\div$ Share exchange ratio on EPS basis)

$$2.25 \div .5625 = \text{Rs. 4.00}$$

Merger effect on EPS with share exchange ratio of 0.5 : 1

Total earnings after merger	Rs. 16,50,000
No. of shares post merger $(3,00,000 + 1,00,000 (.5 \times 2,00,000))$	4,00,000
EPS $16,50,000 \div 4,00,000$	4.125

(ii) Impact on EPS

Co. X' shareholders	Rs.
EPS before merger	4.00
EPS after merger i.e. $(16,50,000 \div 4,00,000)$	4.125
Increase in EPS	0.125

Co. Y' Shareholders	
Equivalent EPS before merger $2.25 \div 0.5$	4.5
EPS after the merger	4.125
Decrease in EPS	0.375

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Question 5

XYZ Ltd., is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at Rs. 20. It has 2,50,000 shares outstanding and its earnings after taxes (EAT) amount to Rs. 5,00,000. ABC Ltd., has 1,25,000 shares outstanding; its current market price is Rs. 10 and its EAT are Rs. 1,25,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd., has agreed to a plan under which XYZ Ltd., will offer the current market value of ABC Ltd.'s shares:

- (i) What is the pre-merger earnings per share (EPS) and P/E ratios of both the companies?
- (ii) If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?
- (iii) What should be the exchange ratio; if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same?

Answer

- (i) Pre-merger EPS and P/E ratios of XYZ Ltd. and ABC Ltd.

Particulars	XYZ Ltd.	ABC Ltd.
Earnings after taxes	5,00,000	1,25,000
Number of shares outstanding	2,50,000	1,25,000
EPS	2	1
Market Price per share	20	10
P/E Ratio (times)	10	10

- (ii) Current Market Price of ABC Ltd. if P/E ratio is 6.4 = Rs. 1 × 6.4 = Rs. 6.40

$$\text{Exchange ratio} = \frac{\text{Rs. 20}}{6.40} = 3.125$$

Post merger EPS of XYZ Ltd.

$$= \frac{\text{Rs. 5,00,000} + \text{Rs. 1,25,000}}{\text{Rs. 2,50,000} + (\text{Rs. 1,25,000}/3.125)}$$

$$= \frac{\text{Rs. 6,25,000}}{\text{Rs. 2,90,000}} = 2.16$$

(iii) Desired Exchange Ratio

Total number of shares in post-merged company

$$= \frac{\text{Post-merger earnings}}{\text{Pre-merger EPS of XYZ Ltd}} = \frac{\text{Rs.6,25,000}}{2} = 3,12,500$$

Number of shares required to be issued

$$= 3,12,500 - 2,50,000 = 62,500$$

Therefore, the exchange ratio is

$$\frac{62,500}{1,25,000} = 0.50$$

Question 6

M Co. Ltd., is studying the possible acquisition of N Co. Ltd., by way of merger. The following data are available in respect of the companies:

Particulars	M Co. Ltd.	N Co. Ltd.
Earnings after tax (Rs.)	80,00,000	24,00,000
No. of equity shares	16,00,000	4,00,000
Market value per share (Rs.)	200	160

- (i) If the merger goes through by exchange of equity and the exchange ratio is based on the current market price, what is the new earning per share for M Co. Ltd.?
- (ii) N Co. Ltd. wants to be sure that the earnings available to its shareholders will not be diminished by the merger. What should be the exchange ratio in that case?

Answer

(i) Calculation of new EPS of M Co. Ltd.

No. of equity shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \text{ shares} \times \text{Rs. } 1.6/\text{Rs. } 2.0 = 3,20,000 \text{ shares}$$

Total no. of shares in M Co. Ltd. after acquisition of N Co. Ltd.

$$= 16,00,000 + 3,20,000 = 19,20,000$$

Total earnings after tax [after acquisition]

$$= 80,00,000 + 24,00,000 = 1,04,00,000$$

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$$\text{EPS} = \frac{\text{Rs. 1,04,00,000}}{19,20,000 \text{ equity shares}} = \text{Rs. 5.42}$$

- (ii) Calculation of exchange ratio which would not diminish the EPS of N Co. Ltd. after its merger with M Co. Ltd.

Current EPS:

$$\text{M Co. Ltd.} = \frac{\text{Rs. 80,00,000}}{16,00,000 \text{ equity shares}} = \text{Rs. 5}$$

$$\text{N Co. Ltd.} = \frac{\text{Rs. 24,00,000}}{4,00,000 \text{ equity shares}} = \text{Rs. 6}$$

$$\text{Exchange ratio} = 6/5 = 1.20$$

No. of new shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \times 1.20 = 4,80,000 \text{ shares}$$

Total number of shares of M Co. Ltd. after acquisition

$$= 16,00,000 + 4,80,000 = 20,80,000 \text{ shares}$$

$$\text{EPS [after merger]} = \frac{\text{Rs. 1,04,00,000}}{20,80,000 \text{ shares}} = \text{Rs. 5}$$

Total earnings in M Co. Ltd. available to new shareholders of N Co. Ltd.

$$= 4,80,000 \times \text{Rs. 5} = \text{Rs. 24,00,000}$$

Recommendation: The exchange ratio (6 for 5) based on market shares is beneficial to shareholders of 'N' Co. Ltd.

Question 7

ABC Ltd. is intending to acquire XYZ Ltd. by merger and the following information is available in respect of the companies:

	ABC Ltd.	XYZ Ltd.
Number of equity shares	10,00,000	6,00,000
Earnings after tax (Rs.)	50,00,000	18,00,000
Market value per share (Rs.)	42	28

Required:

- (i) What is the present EPS of both the companies?

- (ii) If the proposed merger takes place, what would be the new earning per share for ABC Ltd.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.
- (iii) What should be exchange ratio, if XYZ Ltd. wants to ensure the earnings to members are as before the merger takes place?

Answer

- (i) Earnings per share = Earnings after tax /No. of equity shares
 ABC Ltd. = Rs. 50,00,000/10,00,000 = Rs. 5
 XYZ Ltd. = Rs. 18,00,000 / 6,00,000 = Rs. 3
- (ii) Number of Shares XYZ limited's shareholders will get in ABC Ltd. based on market value per share = Rs. 28/ 42 ´ 6,00,000 = 4,00,000 shares
 Total number of equity shares of ABC Ltd. after merger = 10,00,000 + 4,00,000 = 14,00,000 shares
 Earnings per share after merger = Rs. 50,00,000 + 18,00,000/14,00,000 = Rs. 4.86
- (iii) Calculation of exchange ratio to ensure shareholders of XYZ Ltd. to earn the same as was before merger:
 Shares to be exchanged based on EPS = (Rs. 3/Rs. 5) ´ 6,00,000 = 3,60,000 shares
 EPS after merger = (Rs. 50,00,000 + 18,00,000)/13,60,000 = Rs. 5
 Total earnings in ABC Ltd. available to shareholders of XYZ Ltd. = 3,60,000 ´ Rs. 5 = Rs. 18,00,000.
 Exchange ratio based on market price is beneficial to shareholders of XYZ Ltd. because of higher Earnings available to them i.e. (4,00,000 shares ´ Rs. 4.86 = Rs. 19,44,000).

Question 8

The following information is provided related to the acquiring Firm Mark Limited and the target Firm Mask Limited:

	Firm Mark Limited	Firm Mask Limited
Earning after tax (Rs.)	2,000 lakhs	400 lakhs
Number of shares outstanding	200 lakhs	100 lakhs
P/E ratio (times)	10	5

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Required:

- (i) What is the Swap Ratio based on current market prices?
- (ii) What is the EPS of Mark Limited after acquisition?
- (iii) What is the expected market price per share of Mark Limited after acquisition, assuming P/E ratio of Mark Limited remains unchanged?
- (iv) Determine the market value of the merged firm.
- (v) Calculate gain/loss for shareholders of the two independent companies after acquisition.

Answer

Particulars	Mark Ltd.	Mask Ltd.
EPS	Rs. 2,000 Lakhs/ 200 lakhs = Rs. 10	Rs. 400 lakhs / 100 lakhs Rs. 4
Market Price	Rs. 10 ´ 10 = Rs. 100	Rs. 4 ´ 5 = Rs. 20

- (i) The Swap ratio based on current market price is
 $\text{Rs. 20} / \text{Rs. 100} = 0.2$ or 1 share of Mark Ltd. for 5 shares of Mask Ltd.
 No. of shares to be issued = $\text{Rs. 100 lakh} \times 0.2 = \text{Rs. 20 lakhs}$.

- (ii) EPS after merger

$$= \frac{\text{Rs. 2,000 lakhs} + \text{Rs. 400 lakhs}}{200 \text{ lakhs} + 20 \text{ lakhs}}$$

$$= \text{Rs. 10.91}$$

- (iii) Expected market price after merger assuming P / E 10 times.
 $= \text{Rs. 10.91} \times 10 = \text{Rs. 109.10}$

- (iv) Market value of merged firm
 $= \text{Rs. 109.10 market price} \times 220 \text{ lakhs shares} = 240.02 \text{ crores}$

- (v) Gain from the merger
 Post merger market value of the merged firm Rs. 240.02 crores
 Less: Pre-merger market value

Mark Ltd. 200 Lakhs ´ Rs. 100 = 200 crores

Mask Ltd. 100 Lakhs ´ Rs. 20 = 20 crores Rs. 220.00 crores

Gain from merger Rs. 20.02 crores

Appropriation of gains from the merger among shareholders:

	<i>Mark Ltd.</i>	<i>Mask Ltd.</i>
Post merger value	218.20 crores	21.82 crores
Less: Pre-merger market value	200.00 crores	20.00 crores
Gain to Shareholders	18.20 crores	1.82 crores

Question 9

The following information is provided relating to the acquiring company Efficient Ltd. and the target Company Healthy Ltd.

	<i>Efficient Ltd.</i>	<i>Healthy Ltd.</i>
No. of shares (F.V. Rs. 10 each)	10.00 lakhs	7.5 lakhs
Market capitalization	500.00 lakhs	750.00 lakhs
P/E ratio (times)	10.00	5.00
Reserves and Surplus	300.00 lakhs	165.00 lakhs
Promoter's Holding (No. of shares)	4.75 lakhs	5.00 lakhs

Board of Directors of both the Companies have decided to give a fair deal to the shareholders and accordingly for swap ratio the weights are decided as 40%, 25% and 35% respectively for Earning, Book Value and Market Price of share of each company:

- (i) *Calculate the swap ratio and also calculate Promoter's holding % after acquisition.*
- (ii) *What is the EPS of Efficient Ltd. after acquisition of Healthy Ltd.?*
- (iii) *What is the expected market price per share and market capitalization of Efficient Ltd. after acquisition, assuming P/E ratio of Firm Efficient Ltd. remains unchanged.*
- (iv) *Calculate free float market capitalization of the merged firm.*

Answer

Swap Ratio	<i>Efficient Ltd.</i>	<i>Healthy Ltd.</i>
Market capitalisation	500 lakhs	750 lakhs
No. of shares	10 lakhs	7.5 lakhs
Market Price per share	Rs. 50	Rs. 100
P/E ratio	10	5
EPS	Rs. 5	Rs. 20
Profit	Rs. 50 lakh	Rs. 150 lakh

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Share capital	Rs. 100 lakh	Rs. 75 lakh
Reserves and surplus	Rs. 300 lakh	Rs. 165 lakh
Total	Rs. 400 lakh	Rs. 240 lakh
Book Value per share	Rs. 40	Rs. 32

(i) Calculation of Swap Ratio

EPS	1 : 4 i.e.	4.0 ´ 40%	1.6
Book value	1 : 0.8 i.e.	0.8 ´ 25%	0.2
Market price	1 : 2 i.e.	2.0 ´ 35%	0.7
		Total	2.5

Swap ratio is for every one share of Healthy Ltd., to issue 2.5 shares of Efficient Ltd. Hence, total no. of shares to be issued $7.5 \text{ lakh} \times 2.5 = 18.75 \text{ lakh shares}$

Promoter's holding = $4.75 \text{ lakh shares} + (5 \times 2.5 = 12.5 \text{ lakh shares}) = 17.25 \text{ lakh i.e.}$
 Promoter's holding % is $(17.25 \text{ lakh} / 28.75 \text{ lakh}) \times 100 = 60\%$.

Calculation of EPS, Market price, Market capitalization and free float market capitalization.

(ii) Total No. of shares	$10 \text{ lakh} + 18.75 \text{ lakh} = 28.75 \text{ lakh}$
Total capital	$100 \text{ lakh} + 187.5 \text{ lakh} = \text{Rs. } 287.5 \text{ lakh}$
EPS	$\frac{\text{Total profit}}{\text{No. of shares}} = \frac{50 \text{ lakh} + 150 \text{ lakh}}{28.75 \text{ lakh}} = \frac{200}{28.75}$ = Rs. 6.956
(iii) Expected market price	$\text{EPS } 6.956 \times \text{P/E } 10 = \text{Rs. } 69.56$
Market capitalization	$= \text{Rs. } 69.56 \text{ per share} \times 28.75 \text{ lakh shares}$ = Rs. 1,999.85 lakh
(iv) Free float of market capitalization	$= \text{Rs. } 69.56 \text{ per share} \times (28.75 \text{ lakh} \times 40\%)$ = Rs. 799.94 lakh

Question 10

The following information is relating to Fortune India Ltd. having two division, viz. Pharma Division and Fast Moving Consumer Goods Division (FMCG Division). Paid up share capital of Fortune India Ltd. is consisting of 3,000 Lakhs equity shares of Re. 1 each.

Fortune India Ltd. decided to de-merge Pharma Division as Fortune Pharma Ltd. w.e.f. 1.4.2009. Details of Fortune India Ltd. as on 31.3.2009 and of Fortune Pharma Ltd. as on 1.4.2009 are given below:

<i>Particulars</i>	<i>Fortune Pharma Ltd. Rs.</i>	<i>Fortune India Ltd. Rs.</i>
<i>Outside Liabilities</i>		
<i>Secured Loans</i>	<i>400 lakh</i>	<i>3,000 lakh</i>
<i>Unsecured Loans</i>	<i>2,400 lakh</i>	<i>800 lakh</i>
<i>Current Liabilities & Provisions</i>	<i>1,300 lakh</i>	<i>21,200 lakh</i>
<i>Assets</i>		
<i>Fixed Assets</i>	<i>7,740 lakh</i>	<i>20,400 lakh</i>
<i>Investments</i>	<i>7,600 lakh</i>	<i>12,300 lakh</i>
<i>Current Assets</i>	<i>8,800 lakh</i>	<i>30,200 lakh</i>
<i>Loans & Advances</i>	<i>900 lakh</i>	<i>7,300 lakh</i>
<i>Deferred tax/Misc. Expenses</i>	<i>60 lakh</i>	<i>(200) lakh</i>

Board of Directors of the Company have decided to issue necessary equity shares of Fortune Pharma Ltd. of Re. 1 each, without any consideration to the shareholders of Fortune India Ltd. For that purpose following points are to be considered:

- 1. Transfer of Liabilities & Assets at Book value.*
- 2. Estimated Profit for the year 2009-10 is Rs. 11,400 Lakh for Fortune India Ltd. & Rs. 1,470 lakhs for Fortune Pharma Ltd.*
- 3. Estimated Market Price of Fortune Pharma Ltd. is Rs. 24.50 per share.*
- 4. Average P/E Ratio of FMCG sector is 42 & Pharma sector is 25, which is to be expected for both the companies.*

Calculate:

- 1. The Ratio in which shares of Fortune Pharma are to be issued to the shareholders of Fortune India Ltd.*
- 2. Expected Market price of Fortune India Ltd.*
- 3. Book Value per share of both the Companies immediately after Demerger.*

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Answer

Share holders' funds

<i>Particulars</i>	<i>Fortune India Ltd.</i>	<i>Fortune Pharma Ltd.</i>	<i>Fortune India (FMCG) Ltd.</i>
Assets	70,000	25,100	44,900
Outside liabilities	<u>25,000</u>	<u>4,100</u>	<u>20,900</u>
Net worth	<u>45,000</u>	<u>21,000</u>	<u>24,000</u>

1. Calculation of Shares of Fortune Pharma Ltd. to be issued to shareholders of Fortune India Ltd.

Fortune Pharma Ltd.

Estimated Profit (Rs. in lakhs)	1,470
Estimated market price (Rs.)	24.5
Estimated P/E	25
Estimated EPS (Rs.)	0.98
No. of shares lakhs	1,500

Hence, Ratio is 1 share of Fortune Pharma Ltd. for 2 shares of Fortune India Ltd.

2. Expected market price of Fortune India Ltd.

Fortune India (FMCG) Ltd.

Estimated Profit (Rs. in lakhs)	11,400
No. of equity shares (Rs. in lakhs)	3,000
Estimated EPS (Rs.)	3.8
Estimated P/E	42
Estimated market price (Rs.)	159.6

3. Book value per share

	<i>Fortune Pharma Ltd.</i>	<i>Fortune India (FMCG) Ltd.</i>
Net worth (Rs.in lakhs)	21,000	24,000
No. of shares (Rs. in lakhs)	1,500	3,000
Book value of shares	Rs. 14	Rs. 8

Question 11

Reliable Industries Ltd. (RIL) is considering a takeover of Sunflower Industries Ltd. (SIL). The particulars of 2 companies are given below:

Particulars	Reliable Industries Ltd	Sunflower Industries Ltd.
Earnings After Tax (EAT)	Rs.20,00,000	Rs.10,00,000
Equity shares O/s	10,00,000	10,00,000
Earnings per share (EPS)	2	1
PE Ratio (Times)	10	5

Required:

- What is the market value of each Company before merger?
- Assume that the management of RIL estimates that the shareholders of SIL will accept an offer of one share of RIL for four shares of SIL. If there are no synergic effects, what is the market value of the Post-merger RIL? What is the new price per share? Are the shareholders of RIL better or worse off than they were before the merger?
- Due to synergic effects, the management of RIL estimates that the earnings will increase by 20%. What are the new post-merger EPS and Price per share? Will the shareholders be better off or worse off than before the merger?

Answer

- Market value of Companies before Merger

Particulars	RIL	SIL
EPS	Rs.2	Re.1
P/E Ratio	10	5
Market Price Per Share	Rs.20	Rs.5
Equity Shares	10,00,000	10,00,000
Total Market Value	2,00,00,000	50,00,000

- Post Merger Effects on RIL

	Rs.
Post merger earnings	30,00,000
Exchange Ratio (1:4)	

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No. of equity shares o/s (10,00,000 + 2,50,000)	12,50,000
EPS: 30,00,000/12,50,000	2.4
Market Price per share	10.00
Market Value 10 x 2.4	24
Total Value (12,50,000 x 24)	3,00,00,000
Gains From Merger:	Rs.
Post-Merger Market Value of the Firm	3,00,00,000
Less: Pre-Merger Market Value	
RIL 2,00,00,000	
SIL <u>50,00,000</u>	<u>2,50,00,000</u>
Total gains from Merger	<u>50,00,000</u>

Apportionment of Gains between the Shareholders:

<i>Particulars</i>	<i>RIL</i>	<i>SIL</i>
<i>Post Merger Market Value:</i>	<i>Rs.</i>	<i>Rs.</i>
10,00,000 x 24	2,40,00,000	--
2,50,000 x 24	-	60,00,000
Less: Pre-Merger Market Value	2,00,00,000	50,00,000
Gains from Merger:	40,00,000	10,00,000

Thus, the shareholders of both the companies (RIL + SIL) are better off than before

(iii) Post-Merger Earnings:

Increase in Earnings by 20%

New Earnings: Rs.30,00,000 x 20% = Rs.36,00,000

No. of equity shares outstanding: 12,50,000

EPS: Rs. 36,00,000/12,50,000 = Rs.2.88

PE Ratio = 10

Market Price Per Share:

= Rs.2.88 x 10 = Rs.28.80

\ Shareholders will be better-off than before the merger situation.

Question 12

AB Ltd., is planning to acquire and absorb the running business of XY Ltd. The valuation is to be based on the recommendation of merchant bankers and the consideration is to be discharged in the form of equity shares to be issued by AB Ltd. As on 31.3.2006, the paid up capital of AB Ltd. consists of 80 lakhs shares of Rs.10 each. The highest and the lowest market quotation during the last 6 months were Rs.570 and Rs.430. For the purpose of the exchange, the price per share is to be reckoned as the average of the highest and lowest market price during the last 6 months ended on 31.3.06.

XY Ltd.'s Balance Sheet as at 31.3.2006 is summarised below:

	Rs. lakhs
Sources	
Share Capital	
20 lakhs equity shares of Rs.10 each fully paid	200
10 lakhs equity shares of Rs.10 each, Rs.5 paid	50
Loans	100
Total	350
Uses	
Fixed Assets (Net)	150
Net Current Assets	200
	350

An independent firm of merchant bankers engaged for the negotiation, have produced the following estimates of cash flows from the business of XY Ltd.:

Year ended	By way of	Rs. lakhs
31.3.07	after tax earnings for equity	105
31.3.08	do	120
31.3.09	Do	125
31.3.10	Do	120
31.3.11	Do	100
	terminal value estimate	200

It is the recommendation of the merchant banker that the business of XY Ltd. may be valued on the basis of the average of (i) Aggregate of discounted cash flows at 8% and (ii) Net assets value. Present value factors at 8% for years

1-5:	0.93	0.86	0.79	0.74	0.68
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You are required to:

- (i) Calculate the total value of the business of XY Ltd.
- (ii) The number of shares to be issued by AB Ltd.; and
- (iii) The basis of allocation of the shares among the shareholders of XY Ltd.

Answer

Price/share of AB Ltd. for determination of number of shares to be issued:

(Rs.570 + Rs.430)/2	Rs.	500
Value of XY Ltd based on future cash flow capitalization (105×0.93)+(120×0.86)+(125×0.79)+(120×0.74)×(300×0.68)	Rs. lakhs	592.40
Value of XY Ltd based on net assets	Rs. lakhs	250.00
Average value (592.4+250)/2		421.20
No. of shares in AB Ltd to be issued 42120000/500	Nos.	84240
Basis of allocation of shares		
Fully paid equivalent shares in XY Ltd. (20+5) lakhs		2500000
Distribution to fully paid shareholders 84240×20/25		67392
Distribution to partly paid shareholders 84240-67392		16848

Question 13

AFC Ltd. wishes to acquire BCD Ltd. The shares issued by the two companies are 10,00,000 and 5,00,000 respectively:

- (i) Calculate the increase in the total value of BCD Ltd. resulting from the acquisition on the basis of the following conditions:

Current expected growth rate of BCD Ltd.	7%
Expected growth rate under control of AFC Ltd., (without any additional capital investment and without any change in risk of operations)	8%
Current Market price per share of AFC Ltd.	Rs. 100
Current Market price per share of BCD Ltd.	Rs. 20
Current Dividend per share of BCD Ltd.	Re. 0.60

- (ii) On the basis of aforesaid conditions calculate the gain or loss to shareholders of both the companies, if AFC Ltd. were to offer one of its shares for every four shares of BCD Ltd.
- (iii) Calculate the gain to the shareholders of both the Companies, if AFC Ltd. pays Rs.22 for each share of BCD Ltd., assuming the P/E Ratio of AFC Ltd. does not change after the merger. EPS of AFC Ltd. is Rs.8 and that of BCD is Rs.2.50. It is assumed that AFC Ltd. invests its cash to earn 10%.

Answer

- (i) For BCD Ltd., before acquisition

The cost of capital of BCD Ltd. may be calculated by using the following formula:

$$\frac{\text{Dividend}}{\text{Price}} + \text{Growth\%}$$

Cost of Capital i.e., $K_e = (0.60/20) + 0.07 = 0.10$

After acquisition g (i.e. growth) becomes 0.08

Therefore, price per share after acquisition = $0.60/(0.10-0.08) = \text{Rs.}30$

The increase in value therefore is = $\text{Rs.}(30-20) \times 5,00,000 = \text{Rs.}50,00,000/-$

- (ii) To share holders of BCD Ltd. the immediate gain is $\text{Rs.}100 - \text{Rs.}20 \times 4 = \text{Rs.}20$ per share

The gain can be higher if price of shares of AFC Ltd. rise following merger which they should undertake.

To AFC Ltd. shareholders (Rs. (In lakhs))

Value of Company now 1,000

Value of BCD Ltd. 150

1,150

No. of shares 11.25

\ Value per share 1150/11.25= Rs.102.22

Gain to shareholders of BCD Ltd. = $\text{Rs.}102.22 - \text{Rs.}(4 \times 20) = \text{Rs.}22.22$

Gain to shareholders of AFC Ltd. = $\text{Rs.}102.22 - \text{Rs.}100.00 = \text{Rs.}2.22$

Strategic Financial Management

(iii) Gain to shareholders of AFC Ltd:-

Earnings of BCD Ltd. $(5,00,000 \times 2.50) =$ Rs.12,50,000/-Less: Loss of earning in cash Rs.11,00,000/- $(5,00,000/- \times 22 \times 0.10)$

Net Earning Rs.1,50,000/-

Number of shares 10,00,000

Net increase in earning per share 0.15

P/E ratio of AFC Ltd. $= 100/8 = 12.50$

Therefore, Gain per share of shareholders of AFC Ltd.

 $= 0.15 \times 12.50 = \text{Rs.}1.88$ Gain to the shareholders of BCD Ltd. Rs. $(22-20) = \text{Rs.}2/-$ per share

Question 14

A Ltd. wants to acquire T Ltd. and has offered a swap ratio of 1:2 (0.5 shares for every one share of T Ltd.). Following information is provided:

	A Ltd.	T. Ltd.
Profit after tax	Rs.18,00,000	Rs.3,60,000
Equity shares outstanding (Nos.)	6,00,000	1,80,000
EPS	Rs.3	Rs.2
PE Ratio	10 times	7 times
Market price per share	Rs.30	Rs.14

Required:

- The number of equity shares to be issued by A Ltd. for acquisition of T Ltd.
- What is the EPS of A Ltd. after the acquisition?
- Determine the equivalent earnings per share of T Ltd.
- What is the expected market price per share of A Ltd. after the acquisition, assuming its PE multiple remains unchanged?
- Determine the market value of the merged firm.

Answer

- (a) (i) The number of shares to be issued by A Ltd.:

The Exchange ratio is 0.5

So, new Shares = $1,80,000 \times .5 = 90,000$ shares.

- (ii) EPS of A Ltd. After a cquisition:

Total Earnings	(18,00,000+3,60,000)	Rs.21,60,000
No. of Shares	(6,00,000 + 90,000)	6,90,000
EPS	(21,60,000)/6,90,000)	Rs.3.13

- (iii) Equivalent EPS of T Ltd.:

No. of new Shares	0.5
EPS	Rs.3.13
Equivalent EPS (3.13 x .5)	Rs.1.57

- (iv) New Market Price of A Ltd. (P/E remaining unchanged):

Present P/E Ratio of A Ltd.	10 times
Expected EPS after merger	Rs.3.13
Expected Market Price (3.13 x 10)	Rs.31.30

- (v) Market Value of merged firm:

Total number of Shares	6,90,000
Expected Market Price	Rs.31.30
Total value (6,90,000 x 31.30)	Rs.2,15,97,000

Strategic Financial Management

Question 15

BA Ltd. and DA Ltd. both the companies operate in the same industry. The Financial statements of both the companies for the current financial year are as follows:

Balance Sheet

<i>Particulars</i>	<i>BA Ltd. (Rs.)</i>	<i>DA Ltd. (Rs.)</i>
<i>Current Assets</i>	14,00,000	10,00,000
<i>Fixed Assets (Net)</i>	<u>10,00,000</u>	<u>5,00,000</u>
<i>Total (Rs.)</i>	<u>24,00,000</u>	<u>15,00,000</u>
<i>Equity capital (Rs.10 each)</i>	10,00,000	8,00,000
<i>Retained earnings</i>	2,00,000	--
<i>14% long-term debt</i>	5,00,000	3,00,00
<i>Current liabilities</i>	<u>7,00,000</u>	<u>4,00,000</u>
<i>Total (Rs.)</i>	<u>24,00,000</u>	<u>15,00,000</u>

Income Statement

	<i>BA Ltd. (Rs.)</i>	<i>DA Ltd. (Rs.)</i>
<i>Net Sales</i>	34,50,000	17,00,000
<i>Cost of Goods sold</i>	<u>27,60,000</u>	<u>13,60,000</u>
<i>Gross profit</i>	6,90,000	3,40,000
<i>Operating expenses</i>	2,00,000	1,00,000
<i>Interest</i>	70,000	42,000
<i>Earnings before taxes</i>	4,20,000	1,98,00
<i>Taxes @ 50%</i>	<u>2,10,000</u>	<u>99,000</u>
<i>Earnings after taxes (EAT)</i>	<u>2,10,000</u>	<u>99,000</u>
<i>Additional Information :</i>		
<i>No. of Equity shares</i>	1,00,000	80,000
<i>Dividend payment ratio (D/P)</i>	40%	60%
<i>Market price per share</i>	Rs.40	Rs.15

Assume that both companies are in the process of negotiating a merger through an exchange of equity shares. You have been asked to assist in establishing equitable exchange terms and are required to:

- (i) Decompose the share price of both the companies into EPS and P/E components; and also segregate their EPS figures into Return on Equity (ROE) and book value/intrinsic value per share components.
- (ii) Estimate future EPS growth rates for each company.
- (iii) Based on expected operating synergies BA Ltd. estimates that the intrinsic value of DA's equity share would be Rs.20 per share on its acquisition. You are required to develop a range of justifiable equity share exchange ratios that can be offered by BA Ltd. to the shareholders of DA Ltd. Based on your analysis in part (i) and (ii), would you expect the negotiated terms to be closer to the upper, or the lower exchange ratio limits and why?
- (iv) Calculate the post-merger EPS based on an exchange ratio of 0.4: 1 being offered by BA Ltd. and indicate the immediate EPS accretion or dilution, if any, that will occur for each group of shareholders.
- (v) Based on a 0.4: 1 exchange ratio and assuming that BA Ltd.'s pre-merger P/E ratio will continue after the merger, estimate the post-merger market price. Also show the resulting accretion or dilution in pre-merger market prices.

Answer

Market price per share (MPS) = EPS SP/E ratio or P/E ratio = MPS/EPS

- (i) Determination of EPS, P/E ratio, ROE and BVPS of BA Ltd. and DA Ltd.

		BA Ltd.	DA Ltd.
Earnings After Tax	(EAT)	210000	99000
No. of Shares	(N)	100000	80000
EPS	(EAT/N)	2.1	1.2375
Market price per share	(MPS)	40	15
P/E Ratio	(MPS/EPS)	19.05	12.12
Equity Funds	(EF)	1200000	800000
BVPS	(EF/N)	12	10
ROE	(EAT/EF) × 100	17.50%	12.37%

Strategic Financial Management

(ii) Estimation of growth rates in EPS for BA Ltd. and DA Ltd.

Retention Ratio	(1-D/P ratio)	0.6	0.4
Growth Rate	(ROE × Retention Ratio)	10.50%	4.95%

(iii) Justifiable equity shares exchange ratio

- (a) Intrinsic value based = Rs.20 / Rs.40 = 0.5:1 (upper limit)
- (b) Market price based = MPSb/MPSa = Rs.15 / Rs.40 = 0.375:1 (lower limit)

Since, BA Ltd. has a higher EPS, ROE, P/E ratio and even higher EPS growth expectations, the negotiable terms would be expected to be closer to the lower limit, based on the existing share prices.

(iv) Calculation of post merger EPS and its effects

Particulars			BA Ltd.	DA Ltd.	Combined
EAT	(Rs.)	(i)	210000	99000	309000
Share outstanding		(ii)	100000	80000	132000*
EPS	(Rs.)	(i) / (ii)	2.1	1.2375	2.341
EPS Accretion (Dilution)	(Re.)		0.241	(0.301***)	

(v) Estimation of Post merger Market price and other effects

Particulars			BA Ltd.	DA Ltd.	Combined
EPS	(Rs.)	(i)	2.1	1.2375	2.341
P/E Ratio		(ii)	19.05	12.12	19.05
MPS	(Rs.)	(i) / (ii)	40	15	44.6
MPS Accretion	(Rs.)		4.6	2.84***	

* Shares outstanding (combined) = 100000 shares + (.40 × 80000) = 132000 shares

** EPS claim per old share = Rs.2.34 × .04 = Re.0.936

EPS dilution = Rs.1.2375 – Re.0.936 = Re.0.3015

***S claim per old share (Rs.44.60 × 0.4) = 17.84

Less: MPS and per old share 15.00
2.84

EXERCISES

Question 1

Fuller Plc. is intending to acquire Felicy Plc. by merger and the following information is available in respect of the companies:

	<i>Fuller Plc.</i>	<i>Felicy Plc.</i>
<i>Number of equity shares</i>	<i>1,00,000</i>	<i>60,000</i>
<i>Earnings after tax (£)</i>	<i>5,00,000</i>	<i>1,80,000</i>
<i>Market value per share (£)</i>	<i>42</i>	<i>28</i>

Required:

- (i) What is the present EPS of both the companies?
- (ii) If the proposed merger takes place, what would be the new earning per share for Fuller Plc.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.

(Answer: (i) Fuller Plc. = £ 5 and Felicy Plc.= £ 3 (ii) £ 4.86)

Question 2

Cool-cool Ltd. makes thermal clothing for winter sports and outdoor work, and is considering acquiring Sking Shell Ltd. which manufactures and sells ski clothing. Sking Shell is about one quarter of Frozen's size and manufactures its entire product line in a small rented factory on a mountaintop in Manali. It costs about Rs.10,00,000 a year in overhead to operate in the factory. Cool-cool Ltd. produces its output in a less popular in North but more popular north-east locations. Its factory has at least 50% excess capacity. Cool-cool's plan is to acquire Sking Shell, and combine production operations in its north-eastern factory, but otherwise run the companies separately.

Sking Shell's beta is 2.0, Treasury bills currently yield 5% and the Nifty Index is yielding 9%. The corporate income tax rate for both firms is 40%. Because Sking Shell will no longer be maintaining its own production facilities, it can be assumed that only a minimal amount of cash will have to be reinvested to keep its equipment current and for future growth. This amount is estimated at Rs. 1,00,000 per year. Selected financial information for Sking Shell is as follows:

Revenue	Rs. 1,25,00,000
EAT	Rs. 13,00,000
Depreciation	Rs. 6,00,000

Strategic Financial Management

- (a) Calculate the appropriate discount rate for evaluating the Sking Shell acquisition.
- (b) Determine the annual cash flow expected by Cool-cool Ltd. from Sking Shell if the acquisition is made (don't forget to include the synergy).
- (c) Calculate the value of the acquisition to Cool-cool Ltd. assuming the benefits last for (1) five years, (2) 10 years, and (3) 15 years.
- (d) Sking Shell has 2,50,000 shares of stock outstanding. Calculate the maximum price Cool-cool Ltd. should be willing to pay per share to acquire the firm under the three assumptions in part c.
- (e) If Cool-cool Ltd. is willing to assume the benefits of the Sking Shell acquisition will last indefinitely but not grow, what should it be willing to pay per share?

(Answer: (a) 13% (b) Rs. 2,400,000 (c) (1) Rs.8,441,000 (2) Rs.13,023,000
(3) Rs.15,510,000 (d) (1) Rs. 33.76 (2) Rs. 52.09 (3) Rs. 62.04 (e) Rs.73.85)

Question 3

In above question , assume that the cash flow from the Sking Shell acquisition grows at 10% from its initial value for one year and then grows at 5% indefinitely (starting in the third year). Calculate the value of the firm and the implied stock price under these conditions. Use a terminal value at the beginning of the period of 5% growth. What price premium is implied in dollars and as a percent of market price if Sking Shell's stock is currently selling at Rs. 62?

(Answer: 102.10% of market price)