

PAPER – 2 : MANAGEMENT ACCOUNTING AND FINANCIAL ANALYSIS

Answer all questions.

Working notes should form part of the answer.

Question 1

- (a) From the following details relating to a project, analyse the sensitivity of the project to changes in initial project cost, annual cash inflow and cost of capital:

Initial Project Cost (Rs.)	1,20,000
Annual Cash Inflow (Rs.)	45,000
Project Life (Years)	4
Cost of Capital	10%

To which of the three factors, the project is most sensitive? (Use annuity factors: for 10% 3.169 and 11% ... 3.109). (10 Marks)

- (b) ABC Company is considering acquisition of XYZ Ltd. which has 1.5 crores shares outstanding and issued. The market price per share is Rs. 400 at present. ABC's average cost of capital is 12%. Available information from XYZ indicates its expected cash accruals for the next 3 years as follows:

Year	Rs. Cr.
1	250
2	300
3	400

Calculate the range of valuation that ABC has to consider. (PV factors at 12% for years 1 to 3 respectively: 0.893, 0.797 and 0.712). (4 Marks)

- (c) Describe the interface of financial policy with corporate strategic management. (6 Marks)

Answer

- (a) CALCULATION OF NPV

	Rs.
PV of cash inflows (Rs. 45,000 x 3.169)	1,42,605
Initial Project Cost	<u>1,20,000</u>
NPV	<u>22,605</u>
If initial project cost is varied adversely by 10%*	
NPV (Revised) (Rs. 1,42,605 - Rs. 1,32,000)	Rs. 10,605
Change in NPV (Rs. 22,605 – Rs. 10,605)/ Rs. 22,605 i.e	53.08 %

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If annual cash inflow is varied adversely by 10%*

Revised annual inflow Rs. 40,500

NPV (Revised) $(Rs. 40,500 \times 3.169) - (Rs. 1,20,000)$ (+) Rs. 8,345

Change in NPV $(Rs. 22,605 - Rs. 8,345) / Rs. 22,605$ 63.08 %

If cost of capital is varied adversely by 10%*

NPV (Revised) $(Rs. 45,000 \times 3.109) - Rs. 1,20,000$ (+) Rs. 19,905

Change in NPV $(Rs. 22,605 - Rs. 19,905) / Rs. 22,605$ 11.94 %

Conclusion: Project is most sensitive to 'annual cash inflow'.

*Note: Students may please note that they may assume any other percentage rate other than 10 % say 15% , 20 % 25 % etc.

(b) VALUATION BASED ON MARKET PRICE

Market Price per share Rs. 400

Thus value of total business is $(Rs. 400 \times 1.5 \text{ Cr.})$ Rs. 600 Cr.

VALUATION BASED ON DISCOUNTED CASH FLOW

Present Value of cash flows

$(Rs. 250 \text{ cr} \times 0.893) + (Rs. 300 \text{ cr.} \times 0.797) + (Rs. 400 \text{ cr.} \times 0.712) = Rs. 747.15 \text{ Cr.}$

Value of per share $(Rs. 747.15 \text{ Cr.} / 1.5 \text{ Cr.})$ Rs. 498.10 per share

RANGE OF VALUATION

	Per Share	Total
	Rs.	Rs. Cr.
Minimum	400.00	600.00
Maximum	498.10	747.15

(c) INTERFACE OF FINANCIAL POLICY AND STRATEGIC MANAGEMENT

Financial policy required the resource deployments such as materials, labour etc., whereas strategic management considers all markets such as material, labour and capital as imperfect and changing. Strategies are developed to manage the business firm in uncertain and imperfect market conditions and environment, for forecasting planning and formulation of financial policies, for generation and allocation of resources, the finance manager is required to analyse changing market conditions and environment.

The strategy focuses on how to compete in a particular product-market segment or industry. For framing strategy it is considered that the shareholders are not the only interested group in the unit. There are many other influential constituents such as lenders, employees, customers, suppliers etc. The success of a company depends on its ability to service in the product market environment which is possible only when the company considers to maintain and improve its product market positions.

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The strategic management is multi-dimensional. It focuses on growth profitability and flow of funds rather than only on the maximization of market value of shares. This focus helps the management to create enough corporate wealth for achieving market dominance and the ultimate successful survival of the company.

Hence, the financial policy of a company is closed linked with its corporate strategy. The corporate strategy establishes an efficient and effective match between its competences and opportunities and environmental risks. Financial policies of a company should be developed in the context of its corporate strategy. Within the overall framework of a company's strategy, there should be consistency between financial policies- investment, debt and dividend.

Question 2

- (a) New Projects Ltd. is evaluating 3 projects, P-I, P-II, P-III. Following information is available in respect of these projects:

	P-I	P-II	P-III
Cost	Rs. 15,00,000	Rs. 11,00,000	Rs. 19,00,000
Inflows-Year 1	6,00,000	6,00,000	4,00,000
Year 2	6,00,000	4,00,000	6,00,000
Year 3	6,00,000	5,00,000	8,00,000
Year 4	6,00,000	2,00,000	12,00,000
Risk Index	1.80	1.00	0.60

Minimum required rate of return of the firm is 15% and applicable tax rate is 40%. The risk free interest rate is 10%.

Required:

- (i) Find out the risk-adjusted discount rate (RADR) for these projects.
- (ii) Which project is the best? (10 Marks)
- (b) The following data relate to Anand Ltd.'s share price:
- | | |
|-------------------------------|-----------|
| Current price per share | Rs. 1,800 |
| 6 months future's price/share | Rs. 1,950 |
- Assuming it is possible to borrow money in the market for transactions in securities at 12% per annum, you are required:
- (i) to calculate the theoretical minimum price of a 6-months forward purchase; and
- (ii) to explain arbitrating opportunity. (6 Marks)
- (c) Saranam Ltd. has issued convertible debentures with coupon rate 12%. Each debenture has an option to convert to 20 equity shares at any time until the date of maturity. Debentures will be redeemed at Rs. 100 on maturity of 5 years. An investor generally

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requires a rate of return of 8% p.a. on a 5-year security. As an investor when will you exercise conversion for given market prices of the equity share of (i) Rs. 4, (ii) Rs. 5 and (iii) Rs. 6.

Cumulative PV factor for 8% for 5 years : 3.993

PV factor for 8% for year 5 : 0.681 (4 Marks)

Answer

- (a) (i) The risk free rate of interest and risk factor for each of the projects are given. The risk adjusted discount rate (RADR) for different projects can be found on the basis of CAPM as follows:

Required Rate of Return = $I_{Rf} + (k_e - I_{Rf}) \text{ Risk Factor}$

For P-I : RADR = $0.10 + (0.15 - 0.10) 1.80$
= 19%

For P-II : RADR = $0.10 + (0.15 - 0.10) 1$
= 15 %

For P-III : RADR = $0.10 + (0.15 - 0.10) 0.60$
= 13 %

- (ii) The three projects can now be evaluated at 19%, 15% and 13% discount rate as follows:

Project P-I

Annual Inflows	Rs. 6,00,000
PVAF (19 %, 4)	2.639
PV of Inflows (Rs. 6,00,000 x 2.639)	Rs. 15,83,400
Less: Cost of Investment	<u>Rs. 15,00,000</u>
Net Present Value	<u>Rs. 83,400</u>

Project P-II

Year	Cash Inflow (Rs.)	PVF (15%,n)	PV (Rs.)
1	6,00,000	0.870	5,22,000
2	4,00,000	0.756	3,02,400
3	5,00,000	0.658	3,29,000
4	2,00,000	0.572	<u>1,14,400</u>
Total Present Value			12,67,800
Less: Cost of Investment			<u>11,00,000</u>
Net Present Value			<u>1,67,800</u>

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Project P-III			
Year	Cash Inflow (Rs.)	PVF (13%,n)	PV (Rs.)
1	4,00,000	0.885	3,54,000
2	6,00,000	0.7831	4,69,860
3	8,00,000	0.693	5,54,400
4	12,00,000	0.613	<u>7,35,600</u>
Total Present Value			21,13,860
Less: Cost of Investment			<u>19,00,000</u>
Net Present Value			<u>2,13,860</u>

Project P-III has highest NPV. So, it should be accepted by the firm

(b) Anand Ltd

(i) Calculation of theoretical minimum price of a 6 months forward contract-

Theoretical minimum price = Rs. 1,800 + (Rs. 1,800 x 12/100 x 6/12) Rs. 1,908

(ii) Arbitrage Opportunity-

The arbitrageur can borrow money @ 12 % for 6 months and buy the shares at Rs. 1,800. At the same time he can sell the shares in the futures market at Rs. 1,950. On the expiry date 6 months later, he could deliver the share and collect Rs. 1,950 pay off Rs. 1,908 and record a profit of Rs. 42 (Rs. 1,950 – Rs. 1,908)

(c) If Debentures are not converted its value is as under: -

	<u>PVF @ 8 %</u>	<u>Rs.</u>
Interest @ Rs. 12 % for 5 years	3.993	47.916
Redemption Rs. 100 in 5 th year	0.681	<u>68.100</u>
		<u>116.016</u>

Value of equity shares:-

<u>Market Price</u>	<u>No.</u>	<u>Total</u>
Rs. 4	20	Rs. 80
Rs. 5	20	Rs. 100
Rs. 6	20	Rs. 120

Hence, unless the market price is Rs. 6 conversion should not be exercised.

Question 3

(a) Mr. Sinha has invested in three Mutual fund schemes as per details below:

	Scheme X	Scheme Y	Scheme Z
Date of Investment	01.12.2008	01.01.2009	01.03.2009

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Amount of Investment	Rs. 5,00,000	Rs. 1,00,000	Rs. 50,000
Net Asset Value at entry date	Rs. 10.50	Rs. 10.00	Rs. 10.00
Dividend received upto 31.03.2009	Rs. 9,500	Rs. 1,500	Nil
NAV as at 31.3.2009	Rs. 10.40	Rs. 10.10	Rs. 9.80

You are required to calculate the effective yield on per annum basis in respect of each of the three schemes to Mr. Sinha upto 31.03.2009. (6 Marks)

- (b) Classic Finance, a Leasing Company, has been approached by a prospective customer intending to acquire a machine whose cash down price is Rs. 6 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 WDV basis at 25% and Classic Finance's marginal tax rate is 35%. The target rate of return for Classic Finance on the transaction is 10%. You are required to calculate the lease rents to be quoted for the lease for three years. (8 Marks)
- (c) Explain briefly the capital Asset pricing model used in the context of valuation of securities. (6 Marks)

Answer

- (a) Calculation of effective yield on per annum basis in respect of three mutual fund schemes to Mr. Sinha up to 31-03-2009:

PARTICULARS	MFX	MFY	MFZ
(a) Investments	Rs. 5,00,000	Rs. 1,00,000	Rs. 50,000
(b) No. of units	47,619.05	10,000	5,000
(c) Unit NAV ON 31-3-2009	Rs. 10.40	Rs. 10.10	Rs. 9.80
(d) Total NAV on 31-3-2009 (b x c)	Rs . 4,95,238.12	Rs. 1,01,000	Rs. 49,000
(e) Increase / Decrease of NAV (a-d)	(Rs. 4,761.88)	Rs. 1,000	(Rs. 1000)
((f) Dividend Received	Rs. 9,500	Rs. 1,500	Nil
(g) Total yield (e + f)	Rs. 4,738.12	Rs. 2,500	(Rs. 1,000)
(h) Number of Days	121	90	31
(i) Effective yield p.a. (g/a x 365/h x 100)	2.859%	10.139%	(-) 23.55%

- (b) Calculation of depreciation tax shield

(Rs. Lakhs)

Year	Cost / WDV	Dep. @ 25 %	Tax shield @ 0.35	PVF	PV of dep. tax shield
1	600.00	150.00	52.50	0.909	47.72
2	450.00	112.50	39.38	0.826	32.53

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3	337.50	84.38	29.53	0.751	<u>22.18</u>
					<u>102.43</u>
Capital sum to be placed on lease					(Rs. Lakhs)
Cash down price					600.00
Less: PV of depreciation tax shield					<u>102.43</u>
To be placed on lease					<u>497.57</u>
Let the normal annual lease rent were to be "x" then					
Year	Post tax		PVF		PV of cash flow
1	3 x (1-0.35) or 1.95 x		0.909		1.773 x
2	2x (1-0.35) or 1.30x		0.826		1.074x
3	1x (1-0.35) or 0.65x		0.751		<u>0.488x</u>
					<u>3.335 x</u>
Value of x = Rs. 497.57 lakhs / 3.335 i.e					Rs. 149.196 lakhs
Year wise lease rental will be					
					Rs.lakhs
	Year 1		3X 149.196		447.59
	Year 2		2X 149.196		298.39
	Year 3		1X 149.196		149.20

(c) Capital Asset Pricing Model (CAPM)

Capital Asset Pricing Model was developed by Sharpe, Mossin and Lintner in 1960s. 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 premise 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 correlated with that of the market portfolio. All securities do not have same level of systematic risk. Therefore, the required rate of return goes with the level of systematic risk. The systematic risk can be measured by beta, β . Under CAPM, the expected return from a security or portfolio can be expressed as:

$$\text{Expected return on security (Er)} = R_f + \beta (R_m - R_f)$$

Where,

R_f = Risk-free rate of return

β = Beta of security or portfolio

$(R_m - R_f)$ = Risk premium

R_m = Market return

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The model shows that the expected return of a security or a portfolio consists of the risk-free rate of interest plus a risk premium. If the expected return does not meet the required return, then the investment should not be undertaken. The CAPM, when plotted on a graph, 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 to yield returns commensurate with their riskiness, measured by β .

CAPM is based on following assumptions:

- (i) The Investor's objective is to maximise the utility of terminal wealth.
- (ii) Investors make choices on the basis of risk and return.
- (iii) Investors have homogenous expectations of risk and return.
- (iv) Investors have identical time horizon.
- (v) Information is freely and simultaneously available to investors.
- (vi) There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate.
- (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.

Thus, CAPM provides a conceptual frame work for evaluating any investment decision where capital is committed with a goal of producing future returns. However, there are certain limitations of the theory. Some of these limitations are as follows:

- (i) Reliability of Beta: Statistically reliable Beta might not exist for shares of many firms. It may not be possible to determine the cost of equity of all firms using CAPM. All shortcomings that apply to Beta value apply to CAPM too.
- (ii) Other Risks: It emphasis only on systematic risk while unsystematic risks are also important to share holders who do not possess a diversified portfolio.
- (iii) Information Available: It is extremely difficult to obtain important information on risk- free interest rate and expected return on market portfolio as there are multiple risk- free rates for one while for another, markets being volatile it varies over time period.

Question 4

- (a) B Ltd. is a highly successful company and wishes to expand by acquiring other firms. Its expected high growth in earnings and dividends is reflected in its PE ratio of 17. The Board of Directors of B Ltd. has been advised that if it were to take over firms with a lower PE ratio than it own, using a share-for-share exchange, then it could increase its reported earnings per share. C Ltd. has been suggested as a possible target for a

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takeover, which has a PE ratio of 10 and 1,00,000 shares in issue with a share price of Rs. 15. B Ltd. has 5,00,000 shares in issue with a share price of Rs. 12.

Calculate the change in earnings per share of B Ltd. if it acquires the whole of C Ltd. by issuing shares at its market price of Rs.12. Assume the price of B Ltd. shares remains constant. (8 Marks)

- (b) An exporter is a UK based company. Invoice amount is \$3,50,000. Credit period is three months. Exchange rates in London are:

Spot Rate	(\$/£) 1.5865 - 1.5905
3-Month Forward Rate	(\$/£) 1.6100 - 1.6140

Rate of Interest in Money Market:

	Deposit	Loan
\$	7%	9%
£	5%	8%

Compute and show how a money-market hedge can be put in place. Compare and contrast the outcome with a forward contract. (7 Marks)

- (c) Explain the importance of the budget and the revised budget to public sector undertakings. (5 Marks)

Answer

- (a) Total market value of C Ltd is = 1,00,000 x Rs. 15 = Rs. 15,00,000
PE ratio (given) = 10
Therefore , earnings = Rs. 15,00,000 /10
= Rs. 1,50,000
Total market value of B Ltd. is = 5,00,000 x Rs. 12 = 60,00,000
PE ratio (given) = 17
Therefore, earnings = Rs. 60,00,000/17
= Rs. 3,52,941

The number of shares to be issued by B Ltd.

$$\begin{aligned}\text{Rs. 15,00,000} \div 12 &= 1,25,000 \\ \text{Total number of shares of B Ltd} &= 5,00,000 + 1,25,000 = 6,25,000 \\ \text{The EPS of the new firm is} &= (\text{Rs. 3,52,941} + 1,50,000) / 6,25,000 \\ &= \text{Re. 0.80}\end{aligned}$$

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The present EPS of B Ltd is $= \text{Rs. } 3,52,941 / 5,00,000$
 $= \text{Re. } 0.71$

So the EPS of firm B will increase from Re. 0.71 to Rs. 0.80 as a result of merger.

- (b) Identify: Foreign Currency is an asset. Amount \$ 3,50,000.

Create: \$ Liability.

Borrow: In \$. The borrowing rate is 9 % per annum or 2.25 % per quarter.

Amount to be borrowed $\$ 3,50,000 / 1.0225 = \$ 3,42,298.29$

Convert: Sell \$ and buy £. The relevant rate is the Ask rate, namely, \$ 1.5905 per £,

(Note: This is an indirect quote). Amount of £s received on conversion is £ 2,15,214.27
[£ 3,42,298.29 / 1.5905]

Invest: £ 2,15,214.27 will be invested at 5 % for 3 months to get £ 2,17,904.45.

Settle: The liability of \$ 3,42,298.29 at interest of 2.25 per cent per quarter matures to \$ 3,50,000/-. This will be settled with the amount of \$ 3,50,000 received from customer.

Using forward rate, amount received is $= \text{£ } 3,50,000 / 1.6140 = \text{£ } 2,16,852.54$

Amount received through money market hedge $= \text{£ } 2,17,904.45$

Gain $= \text{£ } 2,17,904.45 - \text{£ } 2,16,852.54 = \text{£ } 1,051.91$

So, money market hedge is beneficial for the exporter.

- (c) Importance of Budget and Revised Budget to Public Sector Undertakings (PSUs)

The budget exercise in public sector undertakings is an annual exercise. All revenue and expenditure, (including capital expenditures) and sources and application of funds are budgeted prior to the commencement of financial year. The budget is very important exercise in the public sector undertakings. The budget is important to the PSUs due to the following reasons:

- (i) There is a separate Budget Section of the Accounts and Finance Department responsible for coordinating the budget exercise, collecting data from all departments/divisions concerned and finalising the budget for presentation to the Board of Directors.
- (ii) The budget is prepared on the basis of 'Zero based budgeting' i.e. revenue and expenditure are estimated from scratch or afresh based only on targets set to be achieved during the ensuing year as broadly determined by the Board of Directors or the Management Committee.
- (iii) The budget approved by the Board of Directors forms the basis for all expenditure and yardstick for revenue earning.
- (iv) The works of budgeting- estimating revenue and expenditure is meticulously done and the sanctioned budget becomes a sort of 'bible' for the operating departments. No expenditure can be incurred unless it has been included in the budget. Items of

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expenditure are screened for prior sanction under the budget.

- (v) The revenue target set in the budget needs to be achieved.
- (vi) To keep the expenditure trend balanced with revenue, a fortnightly or monthly reporting of budgeted and actuals is done to all departmental heads.
- (vii) Budget variance report is to be regularly submitted to the top management for its review, decision and corrective directions, where and when necessary.

Revised Budget : In public sector units, there is a also convention of preparing a revised budget ,if required, after expiry of the first two quarters or three quarters of the financial year depending upon exigencies. The revised budget is important to the PSUs due to the following reasons:

- (i) It helps in recognizing developments after the initial budget preparation exercise and in coordinating action plans for the balance part of the year.
- (ii) It also takes into consideration any material change taking place which could not have been envisaged at the time of preparation of the original budget and which is bound to affect the budgeted estimates and actual performance. Thus, the original budget is revised accordingly. Example of significant happenings could be change in exchange rate, new levy of substantial Direct and Indirect taxes and duties, etc.
- (iii) Same level of exercise is carried out in preparation of revised budget as in the case of original budget.

It is, however, very important to keep in mind that the practice of preparing the Revised Budget be strictly followed only when the situation compels such an exercise and should not be liberally pursued.

Question 5

- (a) XYZ established the following spread on the Delta Corporation's stock:
 - (i) Purchased one 3-month call option for 100 Nos. with a premium of Rs. 30 and an exercise price of Rs. 550.
 - (ii) Purchased one 3-month put option for 100 Nos. with a premium of Rs. 5 and an exercise price of Rs. 450.

The current price of Delta Corporation's stock is Rs. 500. Determine XYZ profit or loss if the price of Delta Corporation:

- (i) Stays at Rs. 500 after 3 months.
 - (ii) Falls to Rs. 350 after 3 months.
 - (iii) Rises to Rs. 600. (6 Marks)
- (b) Subhash & Co. earns Rs. 8 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

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be the price per share at 25 per cent dividend payout ratio? Is this the optimum payout ratio as per Walter? (6 Marks)

- (c) A stock costing Rs. 120 pays no dividends. The possible prices that the stock might sell for at the end of the year with the respective probabilities are:

Price	Probability
115	0.1
120	0.1
125	0.2
130	0.3
135	0.2
140	0.1

Required:

- (i) Calculate the expected return.
(ii) Calculate the Standard deviation of returns. (8 Marks)

Answer

- (a) (i) Total premium paid on purchasing a call and put option
= (Rs. 30 per share x 100) + (Rs. 5 per share x 100).
= Rs. 3,000 + Rs. 500 = Rs. 3,500

In this case, XYZ exercises neither the call option nor the put option as both will result in a loss for her.

$$\begin{aligned}\text{Ending value} &= -\text{Rs. } 3,500 + \text{Zero gain} \\ &= -\text{Rs. } 3,500\end{aligned}$$

$$\text{i.e. Net loss} = \text{Rs. } 3,500$$

- (ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

$$\begin{aligned}\text{Total premium paid} &= \text{Rs. } 3,500 \\ \text{Ending value} &= -\text{Rs. } 3,500 + \text{Rs. } [(450 - 350) \times 100] \\ &= -\text{Rs. } 3,500 + \text{Rs. } 10,000 = \text{Rs. } 6,500 \\ \text{i.e. Net gain} &= \text{Rs. } 6,500\end{aligned}$$

- (iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

$$\text{Total premium paid} = \text{Rs. } 3,500$$

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Ending value = – Rs. 3,500 + Rs. [(600-550) x 100]

Net Gain = – Rs. 3,500 + Rs. 5,000 = Rs. 1,500

(b) Walter Model is as follows:-

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

V_c = market value of the share

R_a = Return on retained earnings

R_e = Capitalisation rate

E = Earnings per share

D = Dividend per share

Hence, if Walter model is applied-

$$\text{Market value of the share } V_c = \frac{\text{Rs.2.00} + \frac{0.20}{0.10}(\text{Rs.8.00} - \text{Rs.2.00})}{0.10}$$

or

$$V_c = \frac{\text{Rs.2.00} + \frac{0.20}{0.10}(\text{Rs.6.00})}{0.10}$$

or

$$V_c = \frac{\text{Rs.2.00} + \text{Rs.12.00}}{0.10} = \frac{\text{Rs.14.00}}{0.10} = \text{Rs.140}$$

This is not the optimum payout ratio because $R_a > R_c$ and therefore V_e can further group if payout ratio is reduced.

(c) Here, the probable returns have to be calculated using the formula

$$R = \frac{D}{P_0} + \frac{P_1 - P_0}{P_0}$$

Calculation of Probable Returns

Possible prices (P_1)	$P_1 - P_0$	$[(P_1 - P_0) / P_0] \times 100$
Rs.	Rs.	Return (per cent)
115	-5	-4.17
120	0	0.00
125	5	4.17

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130	10	8.33
135	15	12.50
140	20	16.67

Calculation of Expected Returns

Possible return	Probability	Product
X_i	$p(X_i)$	$X_i \cdot p(X_i)$
-4.17	0.1	-0.417
0.00	0.1	0.000
4.17	0.2	0.834
8.33	0.3	2.499
12.50	0.2	2.500
16.67	0.1	<u>1.667</u>

$$X = \underline{7.083}$$

Expected return $X = 7.08$ per

Calculation of Standard Deviation of Returns

Probable	Probability	Deviation	Deviation squared	Product
return X_i	$p(X_i)$	$(X_i - X)$	$(X_i - X)^2$	$(X_i - X)^2 p(X_i)$
-4.17	0.1	-11.25	126.56	12.66
0.00	0.1	-7.083	50.17	5.017
4.17	0.2	-2.913	8.49	1.698
8.33	0.3	1.247	1.56	0.467
12.50	0.2	5.417	29.34	5.869
16.67	0.1	9.587	91.91	<u>9.191</u>

$$\sigma^2 = \underline{34.902}$$

Variance, $\sigma^2 = 34.902$ per cent

Standard deviation, $\sigma = \sqrt{34.902} = 5.908$ per cent