

Question Paper

Security Analysis - I (211) : January 2007

Section A : Basic Concepts (30 Marks)

- This section consists of questions with serial number 1 - 30.
- Answer all questions.
- Each question carries one mark.
- Maximum time for answering Section A is 30 Minutes.

1. Which of the following statements are **not true** with regard to Public Provident Fund scheme?

[< Answer >](#)

- I. It is a security form of financial investment.
 - II. At the option of the investor, the term of the account opened under this scheme can be extended by the block of 3-years each.
 - III. The facility of nomination is available in this scheme.
 - IV. Withdrawals are not permitted.
- (a) Both (I) and (II) above
 - (b) Both (II) and (III) above
 - (c) (I), (II) and (IV) above
 - (d) (II), (III) and (IV) above
 - (e) All (I), (II), (III) and (IV) above.

2. Which of the following is **not** a lagging indicator?

[< Answer >](#)

- (a) Average duration of unemployment
- (b) Average prime rate charged by banks
- (c) Commercial and industrial loans outstanding
- (d) Initial claims for unemployment insurance
- (e) Change in index of labor cost per unit of output.

3. Which of the following exchanges is particularly meant for small and mid-cap companies?

[< Answer >](#)

- (a) BSE Natex
- (b) Indonext
- (c) Business Line-250 Index
- (d) OTCEI Composite-Index
- (e) CNX Nifty Junior Index.

4. Which of the following is/are **true** with respect to impact cost?

[< Answer >](#)

- I. It is the percentage difference between the executed price and the difference between the best buying and selling prices.
 - II. It determines the liquidity of the company's stock.
 - III. It is the percentage mark-up lost while purchasing or selling a stock with respect to its deal.
- (a) Only (I) above
 - (b) Only (II) above
 - (c) Both (I) and (III) above
 - (d) Both (II) and (III) above
 - (e) All (I), (II) and (III) above.

5. Other things remaining the same, which of the following statements is **not true** while forecasting EPS as per EPS–EBIT relationship? [< Answer >](#)
- EPS increases with an increase of the book value of equity share
 - EPS increases with an increase in the debt to net worth ratio
 - EPS decreases with an increase in the preference capital to net worth ratio
 - EPS increases with an increase in the rate of return on capital employed
 - EPS increases with a decrease in the corporate tax rate.
6. Which of the following statements is **not true** regarding the utility theory to risk return analysis? [< Answer >](#)
- Investors tend to maximize their expected utility
 - Expected utility function is an increasing function of expected return
 - Expected utility function is a decreasing function of the standard deviation of returns
 - Investors' utility function evaluates the expected value and the standard deviation of returns
 - Marginal utility is an increasing function of wealth.
7. The expected return of Kannan Associates Ltd is 11% and the beta of the stock is 0.86. The variances of the returns of the stock and the market are $144(\%)^2$ and $196(\%)^2$. The expected return on the market index is 12%. If the risk-free rate of return is 7%, which of the following statements is/are **true**? [< Answer >](#)
- The stock is under priced.
 - The stock plots below the Security market line.
 - The return on the company's stock exceeds its normal return by 0.3%.
- Only (I) above
 - Only (II) above
 - Both (I) and (III) above
 - Both (II) and (III) above
 - All (I), (II) and (III) above.
8. Other things remaining the same, if the standard deviation of the returns on the market index increases by 25%, the standard deviation of the returns on security 'X' increases by 20%, and the covariance between the security 'X' and the market index decreases by 15%, the systematic risk of the security [< Answer >](#)
- Increases by 46%
 - Increases by 54%
 - Decreases by 46%
 - Decreases by 54%
 - Remains the same.
9. Which of the following statements is **not true** with respect to industry analysis? [< Answer >](#)
- Pioneering stage may offer the highest potential returns and the risk as well
 - Companies may have high dividend payouts in the maturity stage
 - Growth is rapid but orderly for the companies in the expansion stage
 - Stabilization stage is more appealing to the investors primarily interested in capital gains
 - Companies do not experience significant growth in the stabilization stage.
10. Which of the following statements is/are **not true** regarding the lead indicator approach? [< Answer >](#)
- It forecasts GNP in the short run.
 - It puts forward magnitude and duration of change in the economic activity.
 - The indicator should fit logically with the business cycle theory.
 - It measures how widespread a phenomenon is.
- Only (I) above
 - Both (I) and (III) above
 - Both (II) and (III) above
 - (II), (III) and (IV) above
 - (I), (II) and (IV) above.

11. The market values of three divisions of a high-technology firm during the year 2005-06 is given below:

[< Answer >](#)

Division	Beta	Market Value
Personal Computers	1.60	Rs.100 lakh
Software	2.00	Rs.150 lakh
Computer Mainframes	1.20	Rs.250 lakh

Further the company had earnings of Rs.5.00 per share and paid out 40% of its earnings as dividends in 2005-06. The growth rate in earnings and dividends was estimated at 6% and is expected to continue in the future. The risk free rate of return is 7.5% and the return from the market is 12%. If during the year 2006-07, the company is planning to divest its software business, the growth rate is expected to rise to 10%, and the market value of the software unit is equally distributed between the other two units, what would be the change in the price of the share in 2006-07 over 2005-06?

- (a) - Rs.24.97
- (b) - Rs.37.34
- (c) - Rs.40.87
- (d) Rs.40.64
- (e) Rs.46.65.

12. Which of the following statements is/are **true**?

[< Answer >](#)

- I. A non-callable bond is over valued if its option-adjusted yield is less than that of the callable bond.
- II. Option-adjusted duration of a premium callable bond is equal to the duration of the non-callable bond.
- III. The higher the expected interest rate volatility, the lower the option-adjusted spread.

- (a) Only (I) above
- (b) Only (II) above
- (c) Both (I) and (II) above
- (d) Both (I) and (III) above
- (e) All (I), (II) and (III) above.

13. Other things remaining constant, which of the following causes a decrease in the Price-to-Sales (P/S) ratio?

[< Answer >](#)

- I. A decrease in the net profit margin when it is based on the expected earnings.
- II. A decrease in the required rate of return.
- III. A sudden increase in the retention ratio.

- (a) Only (I) above
- (b) Only (II) above
- (c) Both (I) and (III) above
- (d) Both (II) and (III) above
- (e) All (I), (II) and (III) above.

14. Which of the following statements is **not true** with respect to the mutual funds?

[< Answer >](#)

- (a) Net Asset Value (NAV) represents the fair value of a unit of a mutual fund scheme
- (b) The units of closed-ended funds are generally not redeemable at their NAV
- (c) The NAV and the price at which the units of mutual funds are traded in secondary market are not the same
- (d) Open-ended mutual fund companies buy and sell units at their NAV
- (e) Closed-ended funds channelize funds in secondary market in acquisition of corporate securities.

15. Given below is the data regarding five similar residential properties:

[< Answer >](#)

Property	NOI (Rs.)	Market value (Rs.)
A	40,000	6,90,000
B	36,000	6,60,000
C	42,000	7,00,000
D	38,000	6,70,000
E	45,000	7,30,000

If the market extraction method is used to derive the capitalization rate, the market value of a similar property whose NOI is Rs.55,000 is

- (a) Rs. 8,57,558
- (b) Rs. 9,45,667
- (c) Rs. 9,89,445
- (d) Rs.10,45,557
- (e) Rs.10,54,667.

16. Which of the following statements is **not true** with respect to price patterns?

[< Answer >](#)

- (a) The longer it takes for prices to move out of the pattern, the stronger is the base of the new trend
- (b) A valid breakout can be confirmed if the penetration of the boundaries of a pattern are marked by a price change equal to or more than 3%
- (c) The head and shoulders pattern occurs at the end of a bull market
- (d) A runaway gap represents gaps occurring before a trend ends
- (e) After a flag formation, prices move in the same direction as before.

17. Which of the following statements is/are **true** with respect to support and resistance lines?

[< Answer >](#)

- I. New highs are reached after a resistance line is penetrated and new lows follow penetration of a support line.
 - II. Prices are said to be remain in a congestion zone as long as they fluctuate in narrow ranges within a support and resistance level.
 - III. Prices penetrate support level generally after slowing down from a previous high.
- (a) Only (I) above
 - (b) Only (II) above
 - (c) Only (III) above
 - (d) Both (I) and (II) above
 - (e) Both (II) and (III) above.

18. Which of the following trend lines helps to study the share price when they are moving haphazardly and are volatile?

[< Answer >](#)

- (a) Support and resistance level
- (b) Relative strength analysis
- (c) Moving Averages
- (d) Stochastics
- (e) Momentum.

19. Which of the following situations reduces a company's profits?

[< Answer >](#)

- (a) Capitalization of interest charges and patent rights
- (b) Capitalization of differences arising out of exchange fluctuations
- (c) Switching from straight-line method of depreciation to written down value method during later years of the life of the asset
- (d) Writing off miscellaneous expenses over a period of time instead of capitalizing the expenses
- (e) Switching from LIFO to FIFO method of inventory valuation under inflationary circumstances.

20. Which of the following statements is/are **true** with respect to efficient market hypothesis?

[< Answer >](#)

- I. It assumes that the short run price changes are dependent on the previous price changes.
 - II. January anomaly was proposed as a unique rule to make use of tax selling.
 - III. Event studies examine how abnormal rates of return react to significant economic information.
- (a) Only (I) above
 - (b) Only (II) above
 - (c) Both (I) and (II) above
 - (d) Both (II) and (III) above
 - (e) All (I), (II) and (III) above.

21. Which of the following forms of market efficiency suggests that conclusion and opinions drawn by analysts based on publicly available information is also reflected in stock prices?

[< Answer >](#)

- (a) Weak form
- (b) Semi-strong form
- (c) Strong form
- (d) Near strong form
- (e) Super strong form.

22. Following are the yields on zero-coupon bonds as on 1.01.2007:

[< Answer >](#)

Maturity	Interest rate (%)
1.01.2008	10.88
1.01.2009	9.95
1.01.2010	9.97

If it is assumed that the pure expectations theory for the term structure of interest rates holds good, and no liquidity premium exists, and the bonds are equally risky, the implied 1-year rate on 1.01.2009 will be

- (a) 9.00%
- (b) 9.95%
- (c) 10.01%
- (d) 10.78%
- (e) 10.97%.

23. Which of the following is **not true** with respect to liquidity preference theory?

[< Answer >](#)

- (a) In a longer time frame, the fluctuations in the short-term rates cannot be predicted
- (b) The transaction and information costs for short-term maturities are on a larger scale than for long-term maturities
- (c) Liquidity premium is the difference between the forward rate and the expected spot rate
- (d) Returns on long-term securities cannot be hedged
- (e) Inflation premiums could cause the yield curve to slope downward thereby decreasing the interest rates.

24. Which of the following is **true** with respect to realized yield?

[< Answer >](#)

- (a) The realized yield cannot be used to estimate rates of return attainable from various trading strategies
- (b) A low realized yield reflects an investor's expectation of substantial capital gains in a fairly short period of time
- (c) The realized yield depends only on the holding period chosen
- (d) The realized yield will always lie between the YTM and the reinvestment rate
- (e) For bonds with shorter term to maturity, realized yield will be closer to reinvestment rate.

25. You own government bonds with a face value of Rs.20 lakh. The bonds have remaining term to maturity of 6 years and 3 months from today and have a coupon rate of 12%, payable semi-annually. The next coupon will be paid in three months from now. Currently the yield to maturity of these bonds is 6% p.a. compounded semi-annually. How much are the bonds worth today?

[< Answer >](#)

- (a) Rs.26.00 lakh
- (b) Rs.26.76 lakh
- (c) Rs.27.16 lakh
- (d) Rs.27.76 lakh
- (e) Rs.29.16 lakh.

26. Consider the following bonds and portfolios:

[< Answer >](#)

- I. A 19-year corporate bond with coupon 9.5% and face value Rs.10,000 currently selling at Rs.9,976.
- II. A perpetual bond.
- III. A 20-year zero-coupon bond with face value Rs.1,00,000.
- IV. A portfolio with Rs.1,000 invested in Bond I and Rs.12,000 invested in Bond III.

If the yield curve is at 8%, which of the following represents the correct order of the bonds and portfolios when ranked by increasing durations?

- (a) (I), (II), (III) and (IV) above
- (b) (II), (IV), (I), and (III) above
- (c) (I), (II), (IV), and (III) above
- (d) (III), (I), (IV), and (II) above
- (e) (IV), (I), (III), and (II) above.

27. An option writer writes a 6-month naked call option on a stock at a premium of Rs.13 and the strike price of Rs.225. The prevailing market price of the stock is Rs.210. If on the expiration day the price of the stock is Rs.220, then the profit/loss to the option writer will be

[< Answer >](#)

- (a) – Rs.10
- (b) Rs. 7
- (c) Rs. 3
- (d) Rs.10
- (e) Rs.13.

28. Which of the following statements is/are **true**?

[< Answer >](#)

- I. Modified duration can be considered as a representative measure when bonds with embedded options are considered.
 - II. For an option-free bond, effective duration is same as modified duration.
 - III. Empirical duration can be calculated when there is simultaneous change in the price of an asset and the interest rates during the same period.
- (a) Only (I) above
 - (b) Only (II) above
 - (c) Both (I) and (II) above
 - (d) Both (I) and (III) above
 - (e) Both (II) and (III) above.

29. Which of the following statements is **not true** regarding the value of the warrant?

[< Answer >](#)

- (a) Intrinsic value is the minimum value of the warrant
- (b) The maximum value of the warrant is equal to the product of the current market price of the stock and the number of shares obtained from warrant
- (c) The minimum value of the warrant is zero when the current market price is more than the exercise price
- (d) The market price of the warrant should be at least equal to the minimum value so that arbitragers will not make risk-free profits
- (e) Warrant premium is the difference between the warrant price and the minimum price of the warrant.

30. The capital employed by the Majestic Industries is Rs.120 lakh. The weighted average cost of capital for the firm is 12.49%. The net profit made by the company during the year is Rs.30 lakh. The Economic Value Added of the firm according to the residual income method is

[< Answer >](#)

- (a) Rs. 5 lakh
- (b) Rs.12 lakh
- (c) Rs.15 lakh
- (d) Rs.18 lakh
- (e) Rs.20 lakh.

END OF SECTION A

Section B : Problems (50 Marks)

- This section consists of questions with serial number 1 – 5.
- Answer **all** questions.
- Marks are indicated against each question.
- Detailed workings should form part of your answer.
- Do not spend more than 110 - 120 minutes on Section B.

1. Vishnu Ceramics Ltd is planning to issue floating rate bonds with 6-year maturity on 1.12.2006. The face value of the bonds is Rs.1,000 and the issue price is Rs.985. The coupon rate of the bonds is determined each year by loading 2.5% to the rate obtained from the following prices of zero-coupon bonds as of 1.12.2006:

[< Answer >](#)

Maturity date	Price of the bond (Rs.)
1.12.2007	943.40
1.12.2008	898.47
1.12.2009	847.62
1.12.2010	792.16
1.12.2011	754.35
1.12.2012	728.76

The coupon rate is restricted to a maximum of 9%, and it is assumed that the pure expectations hypothesis holds good.

You are **required** to

- a. Compute the YTM of the given floating rate bonds.
- b. Compute the price of the bonds for a 0.5% change in the YTM of the bonds in both directions using the duration concept.
- c. Find out the effective duration of these bonds for a 0.5% change in the YTM of the bonds. What is your comment on the effective duration and modified duration?

(4 + 5 + 2 = 11 marks)

2. The data given below relates to the stock prices of BHEL during October 2002 and October 2006.

[< Answer >](#)

Days on which trading took place in 2002	Stock price (Rs.)	Days on which trading took place in 2006	Stock price (Rs.)
1 st October	159.95	3 rd October	2368.35
3 rd October	159.40	4 th October	2301.10
4 th October	158.75	5 th October	2313.25
7 th October	161.35	6 th October	2326.45
8 th October	160.75	9 th October	2325.35
9 th October	157.90	10 th October	2337.65
10 th October	159.10	11 th October	2317.65
11 th October	159.45	12 th October	2327.90
14 th October	159.00	13 th October	2394.75
16 th October	159.75	16 th October	2426.95
17 th October	159.05	17 th October	2462.20
18 th October	159.45	18 th October	2445.25
21 st October	159.10	19 th October	2415.45
22 nd October	160.40	20 th October	2429.45

23 rd October	161.65	21 st October	2434.30
24 th October	162.00	23 rd October	2446.00
25 th October	161.35	26 th October	2450.35
28 th October	160.60	27 th October	2475.40
29 th October	160.45	30 th October	2441.65
30 th October	157.50	31 st October	2420.10

You are **required** to check whether these stock prices are independent or not using Auto-Correlation test.

(10 marks)

3. Given below are the risk estimates for two stocks X and Y:

[< Answer >](#)

Stock	Covariance with the market	Expected Return	Firm Specific Variance
X	$435.6(\%)^2$	14%	$625(\%)^2$
Y	$580.8(\%)^2$	18%	$1,225(\%)^2$

The risk-free rate of return is 6%, and the standard deviation of the returns on the market index is 22%.

An investor is considering the following two alternatives for investing in the above stocks:

- Place equal proportion of his money in both the stocks.
- Place 25% of his money in Stock X, 40% of his money in stock Y and place his remaining money in the risk-free T-Bills.

You are **required** to

- Compute the total risk associated with stocks X and Y.
- Calculate the expected return and the total risk associated with both the alternatives. Which alternative should the investor prefer if he is considering coefficient of variation as the benchmark?

(4 + 6 = 10 marks)

4. Mr. Indra is planning to invest in the shares of Satyam Computer Services Ltd. and SAIL at the current market prices of Rs.728 and Rs.77 respectively. For this purpose, he has approached Mr. Kiran, a broker. As per the agreement between Mr. Indra and Mr. Kiran, Mr. Kiran would provide 50% of the funds required for purchasing the shares in the form of a loan. If the margin contributed by Mr. Indra falls to 30% of the total market value of holdings, Mr. Kiran has the right to sell the shares immediately and book the losses on behalf of Mr. Indra.

[< Answer >](#)

Mr. Kiran has purchased shares of both the companies on behalf of Mr. Indra. The number of SAIL shares purchased is three times that of Satyam. After the purchase, the prices of both the shares started moving downwards, as a result of which Mr. Indra incurred a loss of Rs.8,221 and his margin account fell down to 30% of the total market value of holdings.

You are **required** to

- Compute the prices of shares of both the companies at which the margin contributed by Mr. Indra falls to 30% of the total market value of holdings, assuming that the price per share of Satyam Computer Services Ltd. is ten times that of SAIL at that time.
- Compute the number of shares purchased of Satyam Computer Services Ltd. and SAIL respectively.
- Compute the total amount of funds invested by Mr. Indra for purchasing the shares of both the companies.

(4 + 4 + 2 = 10 marks)

5. Consider the following daily stock prices of Ranbaxy Laboratories Ltd. on the National Stock Exchange of India:

[< Answer >](#)

Date	High	Low	Close
23 rd October, 2006	417.00	408.10	410.45
26 th October, 2006	415.00	400.25	401.95
27 th October, 2006	408.90	403.05	405.00
30 th October, 2006	406.85	401.00	402.00
31 st October, 2006	408.80	398.00	399.35
1 st November, 2006	405.95	395.30	397.90
2 nd November, 2006	405.00	391.50	403.45
3 rd November, 2006	406.65	400.55	403.70
6 th November, 2006	406.75	401.05	403.45
7 th November, 2006	408.95	401.00	402.20
8 th November, 2006	404.45	398.55	399.95
9 th November, 2006	405.00	398.10	399.25

You are **required** to

- Calculate the % K stochastics for 6-day periods and the % D stochastics for 4-day simple moving average of % K stochastics.
- Calculate the Relative Strength Index of the company using the above prices and explain the significance of the index calculated if the benchmarks for overbought and oversold positions are 80 and 20 respectively.

(5 + 4 = 9 marks)

END OF SECTION B

Section C : Applied Theory (20 Marks)

- This section consists of questions with serial number 6 - 7.
- Answer **all** questions.
- Marks are indicated against each question.
- Do not spend more than 25 -30 minutes on section C.

6. The first challenge in the investment management process lies in choosing the appropriate investments and designing a unit that will meet the investment objectives of the investor subject to his constraints. Briefly, describe the investment objectives and constraints faced by investors.

[< Answer >](#)

(10 marks)

7. Valuation of real estate assets is different from that of bonds or stocks. Explain the characteristics of real estate markets.

[< Answer >](#)

(10 marks)

END OF SECTION C

END OF QUESTION PAPER

Suggested Answers
Security Analysis - I (211) : January 2007

Section A : Basic Concepts

1. Answer : (c) [< TOP >](#)
Reason: It is a non-security form of financial investment. Statement (I) is not true.
At the option of the investor, the term of the account opened under this scheme can be extended by the block of 5-year each Statement (II) is not true.
The facility of nomination is available in this scheme. Statement (III) is true.
It provides liquidity and withdrawals are permitted. Statement (IV) is not true.
Hence (c) is the answer.
2. Answer : (d) [< TOP >](#)
Reason: Average duration of unemployment, average prime rate charged by banks and commercial and industrial loans outstanding are the lagging indicators, as they do not have any forecasting abilities. Change in index of labor cost per unit of output is also lagging indicator but initial claims for unemployment insurance can be used to forecast the future employment position and hence a leading indicator. Therefore, (d) is the answer.
3. Answer : (b) [< TOP >](#)
Reason: Indonext was started as a separate exchange for small, mid-cap companies from January 7, 2005, and was promoted by the BSE and the Federation of Indian stock exchanges (FISE). Hence (b) is the answer.
4. Answer : (d) [< TOP >](#)
Reason: Impact cost is the percentage difference between the executed price and the mean of the best buy and sell prices. It determines the liquidity of the company's stock. It is the percentage mark-up lost while purchasing or selling a stock. Hence statement (I) is not true and statements (II) and (III) are true. Hence (d) is the answer.
5. Answer : (c) [< TOP >](#)
Reason: EPS can be forecasted by estimating the value for the variables that are included in the EPS-EBIT relationship. The relationship between these two parameters is given by:

$$EPS = \frac{NW \left[r \left(1 + \frac{P}{NW} \right) + \frac{D}{NW} (r-i) (1-T) - dP \right]}{N}$$

The above equation suggests that the EPS is a function of

- Book value of equity share (NW/N)
- Debt to networth ratio (D/NW)
- Preference capital to networth ratio (D/NW)
- Rate of return on capital employed (r) and its spread over the interest rate (r-i)
- Corporate tax rate, and
- Preference dividend rate.

The EPS is directly proportional to the first four factors and inversely proportional to the last two factors. Hence statement (c) is not true and is the answer.

6. Answer : (e)

[< TOP >](#)

Reason: Investors tend to maximize their expected utility. Expected utility function is an increasing function of expected return and a decreasing function of the standard deviation of returns. Investors' utility function evaluates the expected value and the standard deviation of returns. Utility function is an increasing function of returns at a decreasing rate. The total utility is an increasing function of wealth, and the marginal utility is a decreasing function of wealth. Statements (a), (b), (c) and (d) are true and statement (e) is wrong. Hence (e) is the answer.

7. Answer : (b)

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Reason: Beta of the stock = 0.86

The amount by which a security's return differs from the normal return for its level of risk is the vertical distance of the security's plot on the graph from the SML. This vertical distance is called alpha (α). Each security's ex-ante alpha is calculated as the difference between the expected return and the required return implied by the SML. i.e.,

$$\alpha = E(r_i) - R(r_i)$$

$$E(r_i) = 11\%$$

$$R(r_i) = R_f + \beta(R_m - R_f) = 7\% + 0.86(12\% - 7\%) = 11.3\%$$

$$\alpha = 11\% - 11.3\% = -0.3\%$$

If the alpha is negative, the stock is overpriced and plots below the SML. The stock's return is less than the normal return by 0.3%. Therefore statement (II) is true and statements (I) and (III) are not true. Hence (b) is the answer.

8. Answer : (d)

[< TOP >](#)

Reason: Systematic risk of a security = $\rho_{i,m}^2 \sigma_i^2$

If σ_i increases by 20%, it can be written as $1.2 \sigma_i$. Similarly if σ_m increases by 25%, it can be written as $1.25 \sigma_m$ and if $\sigma_{i,m}$ decreases by 15%, it can be written as $0.85 \sigma_{i,m}$.

$$\rho_{i,m} = \frac{\sigma_{i,m}}{\sigma_i \sigma_m}$$

$$\frac{\sigma_{i,m}}{\sigma_i \sigma_m} = \frac{0.85 \sigma_{i,m}}{1.20 \sigma_i \times 1.25 \sigma_m}$$

$$\text{After the changes, new } \rho_{i,m} = \frac{0.85 \sigma_{i,m}}{1.20 \sigma_i \times 1.25 \sigma_m} = 0.567 \rho_{i,m}$$

Change in Systematic risk = new systematic risk = $(0.567)^2 (\rho_{i,m})^2 \times (1.2)^2 (\sigma_i)^2 = 0.46 \times \text{old systematic risk}$.

i.e., the systematic risk decreases by 54%. Hence (d) is the answer.

9. Answer : (d)

[< TOP >](#)

Reason: Pioneering stage may offer the highest potential returns, but also offers the greatest risk. Several companies in a particular industry will fail, or do poorly. Many investors wish to avoid risk at this stage. Statement (a) is true.

The second stage, the expansion stage is of most interest to the investors. Growth is rapid but orderly for the companies in the expansion stage. This characteristic in the expansion stage is more appealing to the investors. Statement (c) is true.

The investors interested primarily in the capital gains avoid stabilization stage. Companies may have high dividend payouts in the maturity stage. Companies do not experience significant growth in the stabilization stage. Statements (b) and (e) are true and statement (d) is not true.

Hence (d) is the answer.

10. Answer : (e)

[<TOP>](#)

Reason: The lead indicator approach attempts to forecast the general economic conditions by identifying economic indicators that turn ahead of the change in the general level of economic activity. It identifies factors that provide advance signals of the turning points in the economy. It only provides direction of the change but not magnitude and duration of change. The indicator should also fit logically with the business cycle theory. Statement (II) is not true and statement (III) is true.

Statement (I) is not true because it pertains to GNP model building approach.

Statement (IV) is not true because it pertains to Diffusion index approach.

Hence (e) is the answer.

11. Answer : (d)

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Reason: Beta during 2005-06 = $1.6 \times \left(\frac{100}{500}\right) + 2 \times \left(\frac{150}{500}\right) + 1.2 \times \left(\frac{250}{500}\right) = 1.52$

Required rate of return, $k_e = R_f + \beta(R_m - R_f) = 7.5\% + 1.52(12\% - 7.5\%) = 14.34\%$

$$\frac{D_1}{k_e - g} = \frac{5.00(0.4)(1.06)}{0.1434 - 0.06} = \text{Rs.}25.42$$

Price of the stock = $k_e - g$

During the year 2006-07, if the company divests its software division and equally distributes the cash between other two units,

Beta during 2005-06 = $1.6 \times \left(\frac{175}{500}\right) + 1.2 \times \left(\frac{325}{500}\right) = 1.34$

Required rate of return, $k_e = R_f + \beta(R_m - R_f) = 7.5\% + 1.34(12\% - 7.5\%) = 13.53\%$

$$\frac{D_2}{k_e - g} = \frac{2.00(1.06)(1.10)}{0.1353 - 0.10} = \text{Rs.}66.06$$

Price of the stock = $k_e - g$

Therefore increase in the price of the stock is Rs.40.64.

Hence (d) is the answer.

12. Answer : (d)

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Reason: Price of a non-callable bond = price of callable bond + price of call option on the bond. A non-callable bond is fairly priced if its option-adjusted yield is equal to that of the callable bond. Option-adjusted yield is nothing but the interest rate that equates the present value of the cash flows associated with the bond when held till maturity. A non-callable bond is fairly priced if its option-adjusted yield is equal to that of the callable bond. It is overvalued if its option-adjusted yield is less than that of the callable bond, and it is undervalued if its option-adjusted yield is more than that of the callable bond. Statement (I) is true.

Option-adjusted duration of a deep discount bond is equal to the duration of the non-callable bond, and that of a premium callable bond is zero. Statement (II) is not true.

Option-adjusted spread is a measure of the yield spread, which can be used to convert differences between the values and the process. The higher the expected interest rate volatility, the lower the option-adjusted spread and the lower the expected interest rate volatility, the higher the option-adjusted spread. Statement (III) is true.

Hence (d) is the answer.

13. Answer : (c)

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$$\frac{P_0}{\text{Sales}} = \frac{\text{NPM} \times \text{Pay-out ratio}}{r - g_n}$$

Reason: The P/S ratio is given as

If the NPM is based upon the expected earnings, then the P/S ratio is directly proportional to the NPM and payout ratio and inversely proportional to the required rate of return. Therefore a decrease in the net profit margin, and an increase in the retention ratio (implies decrease in the payout ratio) will decrease the P/S ratio. A decrease in the required rate of return will increase the P/S ratio. Thus statements (I) and (III) are true and statement (II) is not true. Hence (c) is the answer.

14. Answer : (d)

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Reason: As the intrinsic value of the security represents the fair value of the security, the Net Asset Value (NAV) represents the fair value of a unit in a mutual fund. Statement (a) is true.

Open-ended mutual fund companies sell new shares at NAV plus a loading or management fee and redeem them at their NAV. Statement (d) is not true.

The shares of closed-ended funds are not redeemable at their NAV as the open-ended funds. On the other hand, these shares are traded in secondary market on stock exchanges at market prices that may be above or below their NAV. Therefore the NAV and the price at which the units of mutual funds are traded in secondary market need not be always equal. Statement (b) & (c) are true.

Close-ended funds channelize funds in secondary market in acquisition of corporate securities. Statement (e) is true.

Hence (d) is the answer.

15. Answer : (b)

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Reason: According to the market extraction method, capitalization rate is computed as follows:

Property (1)	NOI (Rs.) (2)	Market value (Rs.) (3)	NOI/Market value (%) (4)
A	40,000	6,90,000	5.80
B	36,000	6,60,000	5.45
C	42,000	7,00,000	6.00
D	38,000	6,70,000	5.67
E	45,000	7,30,000	6.16
Capitalization rate = Average of Col (4)			5.816

Now market value of a similar property whose NOI is Rs.55,000 is:

$$\frac{\text{NOI}}{\text{Capitalization rate}} = \frac{\text{Rs.55,000}}{0.05816} = \text{Rs.9,45,667}$$

Hence (b) is the answer.

16. Answer : (d)

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Reason: The significance of a price pattern is a direct function of its size and depth. The longer a pattern takes to complete, and greater the price fluctuations within the pattern, the more substantial the ensuing move is likely to be. Therefore the longer it takes for prices to move out of the pattern, the stronger is the base of the new trend. Statement (a) is true.

A valid breakout can be confirmed if the penetration of the boundaries of a pattern is marked by a price change equal to or more than 3%. Statement (b) is true.

The head and shoulders pattern occurs at the end of a bull market and is characterized by two smaller rallies flanking a higher rally just as the head lies in between two shoulders. Statement (c) is true.

An exhaustion gaps represent gaps occurring before a trend ends, or gaps that precede the last leg of a bullish or abearish trend. Statement (d) is not true.

After a flag formation, prices move in the same direction as before. Statement (e) is true.

Hence (d) is the answer.

17. Answer : (d)

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Reason: New highs are reached after a resistance line is penetrated and new lows follow penetration of a support line. Statement (I) is true.

Prices are said to be remain in a congestion zone as long as they fluctuate in narrow ranges within a support and resistance level. Statement (II) is true.

Prices penetrate support (resistance) level generally after slowing down from a previous low (high) and hovering around a level for sometime. Statement (III) is not true.

Hence (d) is the answer.

18. Answer : (c)

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Reason: When share price move haphazardly and are very volatile, in such circumstances moving averages are used to study the pattern. Therefore, Option (c) is the correct answer.

19. Answer : (d)

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Reason: Capitalization of interest charges inflates company's profits because interest expense against profits gets reduced. Similarly, Capitalization of differences arising out of exchange fluctuations increase the company's profits. Statements (a) and (b) are not true.

Depreciation in the initial years of the life of the asset, is considerably lower under WDV method than in the later years. It is uniform throughout the life of the asset under the straight method. Thus, switching from straight line method to WDV method in the later years will increase the profit figure and vice versa. Statement (c) is not true.

The amortization of preliminary expenses and other miscellaneous expenditure of a capital nature offers ample scope for increasing or decreasing the profits. There is no legal rule prescribed for the write-off of such expenditure. When the expenses are written off over a period of time, the profits during those periods will be low and if such expenses are capitalized, the profits will be high. Hence, statement (d) results in lower profits.

Under inflationary circumstances, a company may switch over from the LIFO method to FIFO method and increase its profits and switching from FIFO to LIFO during decreasing prices result in increased profits. During decreasing prices, under FIFO method of inventory valuation, the value of stock consumed will be high and profits will be low whereas under LIFO, the stock consumed will be low and profits will be high. Hence, switching from LIFO to FIFO the profits will be decreased and statement (e) is not true.

Hence (d) is the answer.

20. Answer : (d) [< TOP >](#)

Reason: EMH assumes that the short run price changes are independent. Statement (I) is not true.
January anomaly was proposed as a unique rule to make use of tax selling. Statement (II) is true.
Event studies aim at testing the EMH by examining how abnormal rates of return react to significant economic information. Statement (III) is true.
Hence (d) is the answer.

21. Answer : (b) [< TOP >](#)

Reason: As per weak form stock price exhibits random walk. Under semi strong form the publicly held information is factored into current stock prices. The super strong form of market efficiency suggests that the confidential information available to select groups like the management, finances and the stock exchange officials is also of no use in obtaining abnormal returns. Hence (b) is the answer.

22. Answer : (c) [< TOP >](#)

Reason: Given $r_1 = 0.1077$
 $r_2 = 0.0995$
 $r_3 = 0.0997$
Now implied one-year rate two years from now can be computed.
Step 1: Implied one-year rate one year (f_2) from now:

$$(1+r_2) = [(1+r_1)(1+f_2)]^{1/2}$$
$$f_2 = \frac{(1+r_2)^2}{(1+r_1)} - 1 = \frac{(1.0995)^2}{1.1088} - 1 = 0.0903$$

Step 2: Implied one-year rate two years (f_3)

$$(1+r_3) = [(1+r_1)(1+f_2)(1+f_3)]^{1/3}$$
$$f_3 = \frac{(1+r_3)^3}{(1+r_1)(1+f_2)} - 1 = \frac{(1.0997)^3}{(1.1088)(1.0903)} - 1$$
$$= 1.1001 - 1 = 0.1001$$
$$= 10.01\%$$

Hence (c) is the answer.

23. Answer : (d) [< TOP >](#)

Reason: In a longer time frame, the fluctuations in the short-term rates cannot be predicted. There is no scope for hedging the returns on short-term securities. Whereas, for long-term securities, this can be achieved by balancing the assets and liabilities. Statement (a) is true and statement (d) is not true.

The transaction and information costs for short-term maturities are on a larger scale than for long-term maturities. Statement (b) is true.

Liquidity premium is the difference between the forward rate and the expected spot rate. Statement (c) is true.

Inflation premiums could cause the yield curve to slope downward thereby decreasing the interest rates. Statement (e) is true.

24. Answer : (d)

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Reason: The realized yield can be used to estimate rates of return attainable from various trading strategies. A high realized yield reflects an investor's expectation of substantial capital gains in a fairly short period of time.
The realized yield depends on the holding period chosen and the reinvestment rate.
The realized yield will always lie between the YTM and the reinvestment rate.
For bonds with longer term to maturity, realized yield will be closer to reinvestment rate, and for the bonds with shorter term to maturity, realized yield will be closer to the YTM.
Hence statement (d) is true and is the answer.

25. Answer : (b)

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Reason: First find the value of the bond as of 3 months from today and then discount this value back to today. In 3 months we will receive Rs.1.2 lakh. Including that initial payment, which need not be discounted, the value of our bond in 3 months is:

$$= 1.2 + 1.2 \times \text{PVIFA}_{(3\%, 12)} + 20 \times \text{PVIF}_{(3\%, 12)}$$

$$= 1.2 + 1.2 \times 9.954 + 20 \times 0.701$$

$$= \text{Rs.} 27.16 \text{ lakh}$$

Now we need to discount this value back half a period.

$$\frac{27.16}{(1.03)^{1/2}} = 26.76$$

The value of the bond is Rs.26.76 lakh.

Hence (b) is the answer.

26. Answer : (c)

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Reason: Bond III: Duration of a zero-coupon bond is equal to its term to maturity. Therefore the duration of bond III is 20 years.

Bond I: Duration can be found out from the following equation:

$$\text{Duration} = \frac{\frac{r_c}{r_d} \times \text{PVIFA}_{(r_d, n)} \times (1 + r_d) + \left(1 - \frac{r_c}{r_d}\right) n}{r_d}$$

$$r_c = \text{current yield} = 950/9,976 = 0.09523$$

$$r_d = 0.08$$

$$\begin{aligned} \text{Duration} &= \frac{0.09523}{0.08} \times \text{PVIFA}_{(8, 19)} \times (1 + 0.08) + \left(1 - \frac{0.09523}{0.08}\right) 19 \\ &= 8.73 \text{ years} \end{aligned}$$

$$\text{Bond II: Duration of a perpetual bond} = \frac{1 + \text{YTM}}{\text{YTM}} = \frac{1.08}{0.08} = 13.5 \text{ years.}$$

Bond IV: 1/13 of the budget is invested in bond I and 12/13 of the budget is invested in bond III.

$$\text{Therefore duration} = \frac{1}{13} \times 8.73 + \frac{12}{13} \times 20 = 19.13 \text{ years}$$

Ranking according to the ascending order = I, II, IV, and III.

Hence (c) is the answer.

27. Answer : (e) [< TOP >](#)

Reason: An option writer who writes a call option has an obligation to sell whereas the buyer or the holder has the option to buy. A call option will be exercised by the buyer only when the price of the stock on the expiration day is more than the strike price of the call option. In the given case as the price of the stock on the expiration day is less than the strike price, the option holder will not exercise the option and pays the premium of the option to the writer. Hence, the gain to the writer will be premium which in this case is Rs.13.

Hence (e) is the answer.

28. Answer : (e) [< TOP >](#)

Reason: Modified duration is not considered as a representative measure when bonds with embedded options are considered. For this another measure called effective duration is considered. For an option-free bond, empirical duration and modified duration are same. Therefore statement (I) is not true and statement (II) is true.

Empirical duration is the actual percentage price change for an asset in response to a change in yield during a specified time period. So empirical duration can be calculated when there is simultaneous change in the price of an asset and the interest rate during the same period. Statement (III) is true.

Hence (e) is the answer.

29. Answer : (c) [< TOP >](#)

Reason: Intrinsic value is the minimum value of the warrant. Statement (a) is true.

The maximum value of the warrant is equal to the product of the current market price of the stock and the number of shares, i.e, $P_s \times N$. Statement (b) is true.

The minimum value of the warrant is zero when the current market price is less than the exercise price. When the current market price is more than the exercise price, minimum value = $(P_s - P_e) \times N$. Statement (c) is not true.

The market price of the warrant should be at least equal to the minimum value so that arbitrageurs will not make risk-free profits. Statement (d) is true.

Warrant premium is the difference between the warrant price and the minimum price of the warrant. Statement (e) is true.

Hence (c) is the answer.

30. Answer : (c) [< TOP >](#)

Reason: EVA of the firm according to the residual income method:

$$EVA = \left[\frac{\text{Net profit}}{\text{Total Capital}} - WACC \right] \text{Total Capital}$$

$$EVA = \left[\frac{\text{Rs.30 lakh}}{\text{Rs.120 lakh}} - 0.1249 \right] \times \text{Rs.120 lakh} = \text{Rs.15.01 lakh} \approx \text{Rs.15 lakh}.$$

Section B : Problems

1. a. YTM of the bonds: [< TOP >](#)

First we need to compute the coupon rates during the six years:

Maturity date	Price of the bond (Rs.)	Interest rate ¹ (%)	Expected Interest rate (%)	Loading (%)	Total (%)	Coupon (%)
1.12.2007	943.40	6.00		2.5	8.50	8.50
1.12.2008	898.47	5.50	$1.055^2/1.06 - 1 = 5.00$	2.5	7.50	7.50
1.12.2009	847.62	5.67	$1.0567^3/1.055^2 - 1 = 6.00$	2.5	8.50	8.50
1.12.2010	792.16	6.00	$1.06^4/1.0567^3 - 1 = 7.00$	2.5	9.50	9.00

1.12.2011	754.35	5.80	$1.058^5/1.06^4 - 1 = 5.00$	2.5	7.50	7.50
1.12.2012	728.76	5.41	$1.0541^6/1.058^5 - 1 = 3.48$	2.5	5.98	5.98

1 For a zero coupon bond, Price = Face value/(1+r)ⁿ

YTM of the bonds:

$$985 = \frac{85}{(1+r)^1} + \frac{75}{(1+r)^2} + \frac{85}{(1+r)^3} + \frac{90}{(1+r)^4} + \frac{75}{(1+r)^5} + \frac{1,059.8}{(1+r)^6}$$

'r' is the YTM in the equation and it can be found out by trial and error.

For r = 8%, R.H.S = Rs.995.53

For r = 9%, R.H.S = Rs.951.17

$$\text{Therefore YTM} = 8\% + \frac{995.53 - 985.00}{995.53 - 951.17} = 8\% + 0.24\% = 8.24\%$$

- b. In order to compute change in the price of the bonds for a specified change in YTM, we need to first compute the duration of these bonds:

Year (1)	Cash flow (2)	PV of cash flow @ 8.24% (3)	Col (2) x Col (3)
1	85	78.53	78.53
2	75	64.02	128.04
3	85	67.03	201.09
4	90	65.57	262.28
5	75	50.48	252.40
6	1059.8	659.02	3,954.12
		984.65	4,876.46
$\text{Duration} = \frac{4,876.46}{984.65} = 4.95 \text{ years}$ $\text{Modified duration} = \frac{D}{1+y} = \frac{4.95}{1+0.0824} = 4.57 \text{ years}$			

Now, for 0.5% increase in YTM, change in price of the bonds:

$$\begin{aligned} \frac{\Delta P}{P} &= -D_{\text{mod}} \times \Delta y \\ &= -4.57 \times 0.5 = -2.285\% \end{aligned}$$

Price of the bonds = 985 (1 - 0.02285) = Rs.962.49

For a 0.5% decrease in YTM, change in price of the bonds:

$$\begin{aligned} \frac{\Delta P}{P} &= -D_{\text{mod}} \times \Delta y \\ &= -4.57 \times -0.5 = 2.285\% \end{aligned}$$

Price of the bonds = 985 (1 + 0.02285) = Rs.1,007.5

- c. Effective duration:

$$D_{\text{eff}} = \frac{P_2 - P_1}{2P_0(\Delta y)}$$

where,

P₂ = the estimated price of the asset after a downward shift in the interest rates

P₁ = the estimated price of the asset after an upward shift in the interest rates

P₀ = current price of the bonds

Δy = change in the yield

$$D_{\text{eff}} = \frac{1,007.5 - 962.49}{2 \times 985 \times 0.005} = 4.57 \text{ years}$$

Comment: Since there is no call option embedded in the bonds, the effective duration is same as modified duration.

2.

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Price changes X	Price changes Y	X ²	Y ²	XY
-0.55	-67.25	0.3025	4522.563	36.9875
-0.65	12.15	0.4225	147.6225	-7.8975
2.6	13.2	6.76	174.24	34.32
-0.6	-1.1	0.36	1.21	0.66
-2.85	12.3	8.1225	151.29	-35.055
1.2	-20	1.44	400	-24
0.35	10.25	0.1225	105.0625	3.5875
-0.45	66.85	0.2025	4468.922	-30.0825
0.75	32.2	0.5625	1036.84	24.15
-0.7	35.25	0.49	1242.563	-24.675
0.4	-16.95	0.16	287.3025	-6.78
-0.35	-29.8	0.1225	888.04	10.43
1.3	14	1.69	196	18.2
1.25	4.85	1.5625	23.5225	6.0625
0.35	11.7	0.1225	136.89	4.095
-0.65	4.35	0.4225	18.9225	-2.8275
-0.75	25.05	0.5625	627.5025	-18.7875
-0.15	-33.75	0.0225	1139.063	5.0625
-2.95	-21.55	8.7025	464.4025	63.5725
$\Sigma X = -2.45$	$\Sigma Y = 51.75$	$\Sigma X^2 = 32.1525$	$\Sigma Y^2 = 16,031.96$	$\Sigma XY = 57.0225$
$\bar{X} = -0.1289$	$\bar{Y} = 2.724$			
$\bar{X}^2 = 0.0166$	$\bar{Y}^2 = 7.4202$			

$$b = \frac{\Sigma XY - n\bar{X}\bar{Y}}{\Sigma X^2 - n\bar{X}^2} = \frac{57.0225 - 19(-0.1289)(2.724)}{32.1525 - 19(0.0166)} = 2.001$$

$$a = \bar{Y} - b\bar{X} = 2.724 - 2.001(-0.1289) = 2.982$$

$$r^2 = \frac{a \Sigma Y + b \Sigma XY - n\bar{Y}^2}{\Sigma Y^2 - n\bar{Y}^2} = \frac{(2.982 \times 51.75) + (2.001 \times 57.0225) - 19(7.4202)}{16,031.96 - 19(7.4202)} = 0.008$$

$$r = 0.089.$$

As it can be seen that the correlation between the prices in two different periods is very small, we can conclude that prices in the two periods were independent and moved in a random fashion.

3. a. Standard deviations of stocks X and Y should be computed.

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Total risk = systematic risk + firm specific unsystematic risk

Stock 'X':

$$\text{Systematic risk} = \beta^2 \sigma_m^2$$

$$\beta = \frac{\sigma_{i,m}}{\sigma_m^2} = \frac{435.6}{(22)^2} = 0.9$$

$$\text{Systematic variance} = (0.9)^2 (22)^2 = 392.04(\%)^2$$

$$\text{Firm specific unsystematic variance} = 625(\%)^2$$

$$\text{Total risk of stock X, } = \sigma_x = \sqrt{392.04 + 625} = 31.89\%$$

Stock 'Y':

$$\text{Systematic risk} = \beta^2 \sigma_m^2$$

$$\beta = \frac{\sigma_{i,m}}{\sigma_m^2} = \frac{580.8}{(22)^2} = 1.2$$

$$\text{Systematic variance} = (1.2)^2 (22)^2 = 696.96(\%)^2$$

$$\text{Firm specific unsystematic variance} = 1,225(\%)^2$$

$$\text{Total risk of stock Y, } = \sigma_y = \sqrt{696.96 + 1225} = 43.84\%$$

- b. Portfolio consisting of equal proportions of stocks X and Y:

$$\begin{aligned} \text{Expected return on the portfolio} &= 0.14 \times 0.5 + 0.18 \times 0.5 \\ &= 0.07 + 0.09 \\ &= 16\% \end{aligned}$$

Total risk of portfolio = Systematic risk + Unsystematic risk

$$\text{Systematic risk of portfolio} = \beta_p^2 \sigma_m^2$$

$$\text{Beta of portfolio} = \beta_x w_x + \beta_y w_y = 0.9 \times 0.5 + 0.5 \times 1.2 = 1.05$$

$$\therefore \text{Systematic risk of portfolio} = (1.05)^2 \times (22)^2 = 533.61 (\%)^2 = 23.1\%$$

Non systematic risk of portfolio =

$$\sqrt{w_x^2 \sigma_{ex}^2 + w_y^2 \sigma_{ey}^2} = \sqrt{0.5^2 \times 625 + 0.5^2 \times 1,225} = 21.5\%$$

$$\text{Total risk of the portfolio} = 23.1\% + 21.5\% = 44.6\%$$

$$\begin{aligned} \text{Coefficient of variation} &= \text{Total risk of the portfolio/Expected return} \\ &= 0.446/0.16 \\ &= 2.78 \end{aligned}$$

Portfolio consisting of 25% of Stock X, 40% of Stock Y and 35% of T-Bills:

$$\begin{aligned} \text{Expected return on the portfolio} &= 0.14 \times 0.25 + 0.18 \times 0.40 + 0.06 \times 0.35 \\ &= 0.035 + 0.072 + 0.021 \\ &= 12.8\% \end{aligned}$$

Total risk of portfolio = Systematic risk + Unsystematic risk

$$\text{Systematic risk of portfolio} = \beta_p^2 \sigma_m^2$$

$$\begin{aligned} \text{Beta of portfolio} &= \beta_x w_x + \beta_y w_y + \beta_{T\text{-bills}} w_{T\text{-Bills}} \\ &= 0.9 \times 0.25 + 1.2 \times 0.4 + 0 \times 0.35 = 0.705 \end{aligned}$$

$$\therefore \text{Systematic risk of portfolio} = (0.705)^2 \times (22)^2 = 240.56 (\%)^2 = 15.51\%$$

Non systematic risk of portfolio =

$$\sqrt{w_x^2 \sigma_{ex}^2 + w_y^2 \sigma_{ey}^2} = \sqrt{0.25^2 \times 625 + 0.40^2 \times 1,225} = 15.33\%$$

Note: Beta and firm specific unsystematic risk of T-Bills are zero.

$$\text{Total risk of the portfolio} = 15.51\% + 15.33\% = 30.84\%$$

$$\begin{aligned} \text{Coefficient of variation} &= \text{Total risk of the portfolio/Expected return} \\ &= 0.3084/0.128 \\ &= 2.41 \end{aligned}$$

Therefore the investor should select portfolio II as the coefficient of variation is less for it.

4. Let the number of shares purchased by the investor in Satyam and SAIL are 'x' and 'y'.

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Given that the number of shares purchased of Satyam and SAIL are in the ratio of 1:3.

So, $y = 3x$ Eq. (1)

Therefore, the total investment made by the investor is $(728x + 77y)$.

Since the initial margin is 50%, the investor places 50% of the total investment and the remaining is borne by the broker. In this case, the initial equity account of the investor is,

$$\frac{1}{2}(728x + 77y)$$

Let P_1 and P_2 are the prices of Satyam and SAIL where the maintenance margin is 30%.

- a. Maintenance margin = Equity account / Market value of the holding

Now, Equity account = Market value of the holding – Margin loan

$$= (P_1x + P_2y) - 1/2 (728x + 77y)$$

$$\text{Therefore, } \frac{(P_1x + P_2y) - \frac{1}{2}(728x + 77y)}{P_1x + P_2y} = \frac{30}{100} = 0.3$$

But $y = 3x$, and $P_1 = 10P_2$

$$\frac{[10P_2X + 3P_2X] - \frac{1}{2}(728X + 77 \times 3X)}{10P_2X + 3P_2X} = 0.3$$

$$\frac{[10P_2X + 3P_2X] - \frac{1}{2}(728X + 231X)}{10P_2X + 3P_2X} = 0.3$$

$$\frac{[13P_2X] - \frac{1}{2}(959X)}{13P_2X} = 0.3$$

$$13P_2X - 479.5X = 3.9P_2X$$

$$9.1P_2X = 479.5X$$

$$P_2 = \text{Rs.} 52.69$$

$$P_1 = 10 \times 52.69$$

$$= \text{Rs.} 526.90$$

- b. At maintenance margin of 30%; the Equity account of the investor is;

$$(P_1x + P_2y) - \frac{1}{2}(728x + 77y) \quad \text{i.e., } (158x + 15.81y).$$

This value is equal to the Initial investment – Loss.

$$\text{Therefore, } (158x + 15.81y) = \frac{1}{2}(728x + 77y) - 8221$$

$$\frac{1}{2}(728x + 77y) - (158x + 15.81y) = 8221$$

$$206x + 22.69y = 8221 \quad \dots\dots\dots \text{Eq (2)}$$

From Eq (1) and Eq (2);

$$206x + 22.69(3x) = 8221$$

$$x = 30.$$

$$\text{So } y = 90.$$

Thus the investor purchased 30 shares of Satyam and 90 shares of SAIL.

- c. The amount initially invested by the investor is, $\frac{1}{2}(728x + 77y)$

$$\text{i.e., } \frac{1}{2}(728 \times 30 + 77 \times 90) = \text{Rs.} 14,385.$$

5. a.

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Day	6	7	8	9	10	11	12
Closing price (C)	397.9	403.45	403.7	403.45	402.2	399.95	399.25
Lowest price during the six-day period (L)	395.3	391.5	391.5	391.5	391.5	391.5	391.5
Highest price during the six-day period (H)	417	415	408.9	408.8	408.95	408.95	408.95
(C-L)	2.6	11.95	12.2	11.95	10.7	8.45	7.75
(H-L)	21.7	23.5	17.4	17.3	17.45	17.45	17.45
%K = (C-L)/(H-L)	0.12	0.51	0.70	0.69	0.61	0.48	0.44

Day	6	7	8	9	10	11	12
%D				0.51	0.63	0.62	0.56

- b. Relative Strength Index (RSI) = $100 - 100/(1 + RS)$

where,

RS = Average of up close prices / Average of down close prices

$$\text{Average of up close prices} = (405 + 403.45 + 403.7)/3 = 404.05$$

Average of down close prices =

$$(401.95 + 402 + 399.35 + 397.9 + 403.45 + 402.2 + 399.95 + 399.25)/8 = 400.76$$

$$\therefore RS = 404.05/400.76 = 1.0082$$

$$RSI = 100 - 100/(1 + 1.0082) = 100 - 49.80 = 50.20.$$

Since the RSI is close to 50, the stock of Ranbaxy is neither in an overbought or oversold position.

Section C: Applied Theory

6. The investment objectives and constraints faced by investors

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Investment Objectives

Rationally stating, all personal investing is designed in order to achieve a goal, which may be tangible (e.g., a car, a house, etc.) or intangible (eg., social status, security, etc.). Goals can be classified into various types based on the way investors approach them viz:

a. Near-Term High Priority Goals

These are goals which have a high emotional priority to the investor and he wishes to achieve these goals within a few years at the most. Eg: A new house. As a result, investment vehicles for these goals tend to be either in the forms equivalent to cash or as fixed-income instruments with maturity dates in correspondence with the goal dates. Because of the high emotional importance these goals have, investor, especially the one with moderate means will not go for any other form of investment which involves more risk especially where his goal is just in sight.

b. Long-Term High Priority Goals

For most people, this goal is an indication of their need for financial independence at a point some years ahead in the future. Eg: Financial independence at the time of retirement or starting a fund for the higher education of a three-year old child. Normally, we find that either because of personal preference or because the discounted present value is large in relation to their resources, the time of realization for such goals is set around 60 years of age for people of moderate means. Because of the long-term nature of such goals, there is not a tendency to adopt more aggressive investment approaches except perhaps in the last 5 to 10 years before retirement. Even then, investors usually prefer a diversified approach using different classes of assets.

c. Low Priority Goals

These goals are must lower down in the scale of priority and are not particularly painful if not achieved. For people with moderate to substantial wealth, these could range from a world tour to donating funds for charity. As a result, investors often invest in speculative kinds of investments either for the fun of it or just to try out some particular aspect of the investment process.

d. Entrepreneurial or Money Making Goals

These goals pertain to individuals who want to maximize wealth and who are not satisfied by the conventional saving and investing approach. These investors usually put all the spare money they have into stocks preferably of the company in which they are working/owning and leave it there until it reaches some level which either the individual believes is enough or is scared of losing what has been built-up over the years. Even then, the process of diversification and building up a conventional portfolio usually takes him a long time involving a series of opportunities and sales spread over many years.

Investment Constraints

An investor-seeking fulfillment of one of the above goals operates under certain constraints:

- Liquidity
- Age
- Need for Regular Income
- Time Horizon
- Risk Tolerance
- Tax Liability

The challenge in investment management, therefore, lies in choosing the appropriate investments and designing a unit that will meet the investment objectives of the investor subject to his constraints. To take on this challenge the first step will be to get acquainted with the different types of investments that are

available in our financial market.

7. Characteristics of Real Estate/Property Markets

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Valuation of real estate portfolio is different from that of bonds or stocks because of the following characteristics:

- a. **Each packet is Unique:** No two real estate investments can be the same, at least if they are located in different places. This difference may not be very significant but the price of one of them may not give any clue about the price of another. Thus the principle of pricing of similar products cannot be applied to real estate pricing.
- b. **Relatively Fewer Players in the Markets:** While there are a large number of players in the stock market or bond market, there are a very few players in the property market. This is because the amount required for investment in property markets is comparatively higher than that required in the other asset markets.
- c. **The Price of a Property is Influential:** In a perfectly competitive market, buyers cannot determine the price. Buyers have no choice. But the situation is different in the case of real estate markets because a buyer who can bid for a much higher price than the second bidder will definitely influence the price of the property. Real estate does not have a market mechanism which allows short selling.
- d. **Real Estate Investment are Large Economic Units:** Property investments cannot be divided into smaller units like equity shares. This may be overcome to a certain extent by way of securitization of real estate investments. But still a property investment must be made as a single unit.
- e. **Extensive Government Controls:** Property markets are subject to several regulations such as tax laws, building codes, environmental norms to be adhered to, etc. These act as detrimental factors to the development of real estate. Frequent changes in government regulations may cause change in ownership position of a real estate which poses an additional risk.
- f. **Slow Reaction of Supply to Demand:** Supply and demand in real estate do not balance. This is because it takes time for conversion of a property from one use to another use. This adds to the complication of the valuation of an investment.
- g. **Unorganized Market:** There is no regulated market available for real estate. So the price of the real estate becomes difficult to be estimated. Though the shares in Real Estate Investment Trusts (REITS) are traded, they do assume the properties of a share rather than those of a real estate.
- h. **Insufficient Data about Market Prices:** Absence of an organized market and indivisible nature of real estate investment are the reasons for the availability of reliable information about the prices of real estate. Even the buyers and sellers are not willing to disburse the price information. Unless lease agreement is signed, it is not possible to estimate the price of a vacant space in any building. Thus, price information about the property is difficult to obtain.
- i. **Illiquid Nature:** Very few transactions occur in real estate over a period of time. So a definite trend of the prices over time is difficult to determine. The risk and return characteristics are also difficult to estimate.

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