

Question Paper

Security Analysis (211) : April 2003

Part A : Basic Concepts (30 Points)

- This part consists of questions with serial number 1 - 30.
- Answer **all** questions.
- Each question carries one point.
- Maximum time for answering Part A is 30 Minutes.

1. According to the Capital Asset Pricing Model (CAPM), the expected return of a well diversified portfolio with a beta of 1.0 and positive ex-ante alpha (α) is
 - a. The risk-free rate, r_f
 - b. $\beta (r_m - r_f)$
 - c. Between r_m and r_f
 - d. The expected return on the market, r_m
 - e. $r_m + \alpha$.
2. Which of the following would be a **true** evidence against the semi-strong form of the efficient market theory?
 - a. Mutual fund managers do not persistently make superior returns
 - b. Trend analysis is worthless in determining stock prices
 - c. Positive abnormal returns can be expected from low P/E stocks
 - d. No investor can make superior profits by purchasing or selling stocks after the announcements of unexpected rise in dividends
 - e. None of the above.
3. The following regression equation reflects the relationship of Blue moon stock's return with the market return
$$r_{BM} = 0.10 + 1.12r_m$$
If the market index rises by 10% and Blue moon's stock price rises by 9.35%, the abnormal change in Blue moon's stock price is
 - a. - 3.25%
 - b. - 2.10%
 - c. - 1.95%
 - d. - 1.85%
 - e. + 1.95%.
4. Which of the following statements is/are **true** in relation to the trading of option contract?
 - I. Options are not traded in the over-the-counter (OTC) market in India
 - II. Contract size of listed stock option are adjusted for stock splits and stock dividends
 - III. Option premiums are adjusted for regular cash dividends
 - a. Only (I) above
 - b. Only (II) above
 - c. Both (I) and (II) above
 - d. Both (II) and (III) above
 - e. (I), (II) and (III) above.

5. Margin in a futures contract depends on the price volatility of the underlying asset. The margin requirement can be estimated by calculating
- I. Average daily absolute change in the value of futures contract
 - II. Average number of transactions of the futures contract
 - III. Standard deviation of the absolute change in the value of futures contract
 - IV. Coefficient of variation of the absolute change in the value of futures contract.
- a. Only (I) above
 - b. Only (III) above
 - c. Only (IV) above
 - d. Both (II) and (IV) above
 - e. Both (I) and (III) above.
6. Which of the following **cannot** be viewed as a benefit of investing in a mutual fund scheme?
- a. Diversification
 - b. Tax benefits
 - c. Assured returns
 - d. Botheration free investment
 - e. Revolving type of investment.
7. If the market interest rate change, the value of a put option also changes due to change in
- a. The dividend rate
 - b. The volatility of the underlying asset
 - c. Present value of the exercise price
 - d. The maturity period of option contract
 - e. The market price of the underlying stock.
8. If the spot rates on 1 year, 2 years and 3 years GOI securities are 5%, 5.5% and 6% respectively, then one year forward rate 2 years hence, as per Pure Expectations Theory is
- a. 5.00%
 - b. 6.00%
 - c. 7.00%
 - d. 8.00%
 - e. 8.50%.
9. The stock of Finolox Ltd. is currently trading at Rs.180, current dividend per share is Rs.5 and the required rate of return is 15%. The growth rate of the company's earnings is
- a. 17.29%
 - b. 14.23%
 - c. 11.89%
 - d. 10.25%
 - e. 9.75%.
10. Which of the following can be a form of utility function at expected security return ranging between 10 – 12%?
- [U(r) is the expected utility of the investor at the level of return r].
- a. $U(r) = 25r - r^2$
 - b. $U(r) = 3r - 10r^2$
 - c. $U(r) = 72r + 3r^2$
 - d. $U(r) = 6r - 7r^2$
 - e. Both (b) and (d) above.

11. If 91 – day treasury bills with a face value of Rs.100 each have been aligned with the term structure of interest rate and are available at a discount of 3.5% p.a., then the treasury bills are presently selling at
- Rs.99.78
 - Rs.99.13
 - Rs.95.23
 - Rs.91.23
 - Rs.87.26.
12. Consider the prices of a stock on last 10 trading days.

Day	Closing price (Rs.)
1	32
2	34
3	36
4	38
5	40
6	38
7	42
8	41
9	39
10	40

If the time span of the average is 6 days, the moving average price on the 9th day is

- Rs.32.50
 - Rs.36.33
 - Rs.39.67
 - Rs.39.92
 - Rs.41.00.
13. The market value of the shares of CNX NIFTY index on a day is Rs.302185.25 crore. The base year average value of index was Rs.270.25 crore. If the market value of stocks of a firm which is part of Nifty stocks since beginning increases by Rs.1360 crore due to recent rights issue, the revised value of base year average considering other things remain the same is
- Rs.270.35 crore
 - Rs.271.00 crore
 - Rs.271.47 crore
 - Rs.272.36 crore
 - Rs.274.52 crore.
14. Which of the following is/are **not true** with regard to the divergence of Advance – Decline (A–D) line from the market index?
- In a bull market, the A–D line generally peaks ahead of the market index.
 - The longer and greater the divergence, the implied divergence may be expected to be deeper and more substantial
 - When the A–D line persistently refuses to confirm a new low in the market index, a downtrend reversal is not expected
 - At market bottoms, the A–D line generally coincides with or lags behind the market index
 - Both (c) and (d) above.

15. Which of the following is/are **true**?

- I. The value of the RSI indicator fluctuates between 0 and 100
- II. When the RSI indicator crosses the oversold position at 30 from below it is taken as signal to buy
- III. When the RSI indicator crosses the overbought position at 70 from above it is a signal to sell

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

16. Change in which of the following accounting policies will **not** change the profit figures reported between two time periods?

- a. Treatment of R & D expenditure
- b. Treatment of gratuity liability
- c. Valuation of Inventories
- d. Revaluation of fixed assets
- e. Treatment of depreciation provisions.

17. A stock which is less risky than the market will have

- I. A beta greater than 1
- II. A beta that is less than its correlation coefficient with the market index
- III. A beta less than 1

- 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. Consider the following information

Market prices	Rs.
Stock (Face value = Rs.10)	14
Convertible bonds (Face value = Rs.100)	130

If premium over conversion value is 3.17%, the conversion rate of the convertible bond is

- a. 7
- b. 8
- c. 9
- d. 10
- e. 11.

19. Which of the following theories states that the shape of the yield curve is dependent on the supply and demand of securities available within each maturity sector?

- a. Preferred habitat theory
- b. Liquidity premium theory
- c. Pure expectations theory
- d. Relative strength theory
- e. None of the above.

20. The duration of a bond which is currently trading at Rs.975.25 is 6.25 years. If the YTM of the bond increases from 12% to 12.65%, the new price of the bond will be
- Rs.932.76
 - Rs.935.63
 - Rs.939.88
 - Rs.942.38
 - Rs.945.39.
21. An analyst believes that the Dividend Per Share (DPS) of a stock will grow at the rate of 25% p.a for three years, and the growth rate will decline linearly to a constant long run growth rate of 13% p.a. over a four year transition phase. If the current DPS is Rs.5.25, the expected dividend per share at the end of 7th year will be
- Rs.10.25
 - Rs.12.51
 - Rs.14.89
 - Rs.17.27
 - Rs.19.51.
22. Which of the following statements is/are **true** in relation to futures contract?
- The difference between the two prices of the futures contract is called as spread
 - The intercommodity futures spreads require lower margin than single futures contract
 - Basis = Futures price – Current cash price
 - Basis is higher for futures contracts with longer maturity
- Only (I) above
 - Only (II) above
 - Both (I) and (IV) above
 - Both (III) and (IV) above
 - (I), (II) and (IV) above.

23. Consider the following long-term bonds available in the market:

	Coupon (%)	YTM (%)	Maturity (years)
A	12	10	20
B	12	10	15
C	0	10	20
D	8	10	20
E	12	15	15

Which of the following is **correct** order of bonds in descending duration?

- C, D, A, E, B
 - C, D, A, B, E
 - C, A, D, B, E
 - A, C, D, E, B
 - D, A, C, E, B.
24. Which of the following is/are **false** in relation to term structure of interest rates?
- Yield curve cannot have a negative slope
 - Yield spreads between high and low grade corporate bonds tend to widen during a boom period in the economy
 - Riding the yield curve is strategy requires purchase of short term bonds when the yield curve is sloped upwards and expected to maintain the same level and slope.
- Only (I) above
 - Only (II) above
 - Both (I) and (II) above
 - Both (I) and (III) above
 - Both (II) and (III) above.

25. Which of the following is **not** a lagging indicator?
- Average duration of unemployment
 - Average prime rate charged by banks
 - Commercial and industrial loans outstanding
 - Initial claims for unemployment insurance
 - Change in index of labor cost per unit of output.
26. In which of the following stage of a industry life cycle, the product penetrates the market place and becomes more commonly used?
- Pioneering stage
 - Expansion stage
 - Stabilization stage
 - Declining stage
 - Maturity stage.
27. Constant-growth dividend discount model would be most suitable for valuing stocks of a
- New firm which is expected to retain its earnings for several years
 - Fast growing company
 - Company with valuable assets not yet generating profits
 - Moderate-growth, "mature" company
 - Company with very less number of assets.
28. Which of the following indicates the presence of an intense rivalry in a particular industry?
- Numerous or equally balanced competitors
 - High growth rate of the industry
 - High fixed cost
 - Presence of differentiation or switching costs
- Only (I) above
 - Only (II) above
 - Both (I) and (III) above
 - Both (III) and (IV) above
 - (II), (III) and (IV) above.
29. A portfolio has 40% of its fund invested in security A and the balance in security B. The standard deviation of security A's return is 10% and its correlation coefficient with security B's return is 0.5. If the variance of the portfolio is $133(\%)^2$. The standard deviation of security B's return is
- 10%
 - 12%
 - 15%
 - 18%
 - 20%.
30. Which of the following is/are **true** if a bond is selling at its face value?
- The change in the price of the bond is more when yield decreases by 1% than the change in the price of the bond if yield increases by 1%
 - YTM of the bond is equal to its coupon rate
 - YTM of the bond is equal to its reinvestment rate
- Only (I) above
 - Only (II) above
 - Both (I) and (II) above
 - Both (I) and (III) above
 - (I), (II) and (III) above

END OF PART A

Part B : Problems (50 Points)

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

1. Indiana Ltd. has announced right issue of partly convertible debentures (PCDs) to part finance its Rs.150 crore vertical integration program. Considering the depressed interest rate scenario the company has decided to issue each debenture of face value Rs.1,000 at Rs.950 only. The annual coupon payable on debenture is 11%. Each debenture has three parts and its features are given as under:

Part	
A	20% of the face value will be converted into one equity share on allotment
B	30% of the face value will have a warrant attached to it
C	The balance 50% of face value will be redeemed at the end of 5th, 6th and 7th year in proportion of 2:2:1

The following are the options available to the investor:-

- a. Exchange part B and the warrant for one equity share at the end of second year.
- b. Retain part B and let the warrant lapse. In that case, part B will be redeemed at the end of the 7th year.

For the past seven years the company's earnings are growing at a rate of 25% p.a. It is expected that the growth rate will decline linearly during the next seven years and stabilize at 11% p.a. thereafter. Retention ratio of the firm remains constant at 0.6.

If the required rate of the investors is 12.5%, you are **required** to determine whether it is desirable to invest in the debentures and the option that an investor should choose. Assume that the equity shares are traded at the intrinsic value at the end of seven years and the investor disowns all the equity holdings at the end of seven years.

(12 points)

2. Suppose the assumptions of CAPM are valid and unlimited borrowing and lending at risk-less rate of interest is possible. Complete the blanks in the following table:

Stock	Expected Return (%)	Standard Deviation (%)	Beta	Unsystematic Risk (%) ²
Sonata Software	14	—	1.75	12
Prism Cements	—	6	0.82	5
Standard Cosmetics	10	—	0.60	18

(4 + 2 + 2 = 8 points)

3. Ramesh wants to invest in a bond that matures after six years from now. The face value of the bond is Rs.1,000 and it carries a coupon rate of 10.75%. If the bond is currently trading at Rs.950. You are **required** to calculate

- a. The duration of the bond
- b. The price of the bond if interest rate increases by 0.50%.

(5 + 1 = 6 points)

4. Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February 2003.

Day	High	Low	Closing
4/02/03	3,306.40	3,290.00	3,296.50
5/02/03	3,298.00	3,262.50	3,294.40
6/02/03	3,256.20	3,227.00	3,230.40
7/02/03	3,233.00	3,201.50	3,212.30
10/02/03	3,281.50	3,256.00	3,267.50
11/02/03	3,283.50	3,260.00	3,263.80
12/02/03	3,315.00	3,286.30	3,292.00
14/02/03	3,315.00	3,257.10	3,309.30
17/02/03	3,278.00	3,249.50	3,257.80
18/02/03	3,118.00	3,091.40	3,102.60

Suneeta Roy bought one Sensex futures contract on February 04. The average daily absolute change in the value of contract is Rs.10,000 and standard deviation of these changes is Rs.2000. The maintenance margin is 75% of the initial margin.

You are **required** to determine the daily balances in the margin account and payment on margin calls, if any.

(8 points)

5. Construction of a shopping complex is proposed to be financed by issuing bonds and equity shares in the proportion of 6:4. The details of the proposed instruments are as follows.
- Bonds, bearing a coupon rate of 10.75% per annum and maturing in 8 years. The interest will be compounded semi-annually. To redeem the bonds on maturity a sinking fund is established. The coupon payment is tax deductible.
 - Equity, on which the investors require a return of 16%.

The expected net operating income from the property is Rs.100 lakhs and the effective tax rate applicable is 30%.

You are **required** to calculate

- Capitalization rate
- Market value of property.

(5 + 1 = 6 points)

6. During the year 2002-03, three companies Star Software Ltd., Kanishka Airways and Indian Auto Ltd. have announced higher dividends on December 31, 2002. A financial analyst working in a brokerage firm wanted to test the consistency of the semi-strong form of market efficiency. He estimated the characteristic lines for a period of 4 years on a monthly basis upto September 30, 2002. The relationship between the returns on these three companies and the market index are represented by following equations.

$$r_{S,t} = 1.25\% + 0.92r_{mt}$$

$$r_{K,t} = 1.39\% + 1.03 r_{mt}$$

$$r_{I,t} = 1.78\% + 1.07 r_{mt}$$

Where $r_{S,t}$, $r_{K,t}$ and $r_{I,t}$ are the returns of Star Software, Kanishka Airways and Indian Auto during period t and $r_{m,t}$ is return of the market index during the same period. The following data pertains to the returns of the companies and market for the period 3 months before and 3 months after the dividend was declared.

Period (Months)	Actual return (%)			Market return (%)
	$r_{S,t}$	$r_{K,t}$	$r_{I,t}$	r_{mt}
Sep 30, 2002	11.21	11.78	12.25	10.25
Oct 31, 2002	11.42	12.49	13.25	10.75
Nov 30, 2002	12.02	13.02	13.39	10.90
Dec 31, 2002	11.98	12.29	13.10	10.80
Jan 31, 2003	12.92	13.45	14.25	11.25
Feb 28, 2003	12.23	13.02	14.01	10.92
Mar 31, 2003	12.75	13.21	14.19	11.15

Using event studies approach you are **required** to verify the validity of semi-strong form of market efficiency in the Indian stock market.

(10 points)

END OF PART B

Part C : Applied Theory (20 Points)

- This part consists of questions with serial number 7 - 8.
- Answer **all** questions.
- Points are indicated against each question.
- Do not spend more than 25 -30 minutes on Part C.

7. Recently SEBI has approved a uniform model of corporatization and demutualization for all exchanges. Demutualization is a process of changing the corporate structure of an exchange to the status of limited liability or corporation. Briefly discuss the advantages of demutualization of the stock exchanges.

(10 points)

8. Identification of support and resistance levels is an important application of trend line. Enumerate the importance of support and resistance lines in technical analysis and also discuss the principles involved while using these for trend analysis.

(10 points)

END OF PART C

END OF QUESTION PAPER

Suggested Answers

Security Analysis (211) : April 2003

Part A : Basic Concepts

1. Answer : (e)

Reason : According to Capital Asset Pricing Model.

$$\text{Required return} = r_F + \beta (r_m - r_f)$$

$$\text{Alpha} = \text{Expected return} - \text{Required return}$$

$$\text{If alpha} = \alpha, \text{ Then expected return} = \text{Required return} + \alpha$$

Required:

$$\text{Return} = r_F + (r_m - r_f) 1.00 = R_m$$

$$\text{Expected return} = r_m + \text{Alpha} (\alpha)$$

2. Answer : (c)

Reason : When mutual fund managers do not on average make superior returns that means using public information any abnormal return is not possible and this supports semi-strong form of market hypothesis. Hence (a) is not correct. Trend analysis will be worthless if historical information cannot be used for superior returns and this also supports semi-strong form of market efficiency. Hence (b) is not correct. If positive abnormal returns can be expected from low P/E stock it signifies that publicly available information can be used to gain abnormal return and this is in against semi-strong form of market efficiency. However, if no investor can make superior profits by buying or selling stock after the announcement of expected rise in dividends it is in accordance with semi-strong form efficiency rules. Hence (c) is correct.

3. Answer : (d)

$$\text{Reason : } r_{Bm} = 0.1 + 1.12 r_m$$

$$r'_{Bm} = 0.1 + 1.12 r'_m$$

$$(r_{Bm} - r'_{Bm}) = 1.12 (r_m - r'_m)$$

$$= 1.12 \times 10 = 11.2$$

$$\text{Abnormal} = 9.35 - 11.2 = -1.85\%.$$

4. Answer : (e)

Reason : Option are not traded in the OTC market in India. Listed stock option are adjusted for stock splits and stock dividends because it affects the terms of option contracts. Hence (I) is correct. Option premium are adjusted for regular cash dividend basis. Hence (II) and (III) are also correct and (e) is the answer.

5. Answer : (e)

Reason : Futures margin depend on the price volatility of the underlying asset. Exchanges generally set this margin equal to $\mu + 3\sigma$ then μ is the average daily absolute change in the value of contract and σ is standard deviation of these changes over a period of time. Hence only (I) and (III) are correct and therefore (e) is the answer.

6. Answer : (c)

Reason : Diversification, tax exemption, Botheration free investment, revolving type of investment and wide investment opportunities are the important advantages of investing in a mutual fund scheme. Mutual funds do not provide assured returns. Hence (c) is the answer.

7. Answer : (c)

Reason : When interest rate changes the discount factor to be used for discounting the exercise price of put option will also change and this will affect the value of put option contract. Hence (c) is the answer.

8. Answer : (c)

$$\begin{aligned}\text{Reason : } f_{23} &= \frac{(1+S_3)^3}{(1+S_2)^2} - 1 \\ &= \frac{(1.06)^3}{(1.055)^2} - 1 \\ &= 1.07 - 1 = 7\%.\end{aligned}$$

9. Answer : (c)

$$\begin{aligned}\text{Reason : } P_0 &= \frac{D_1}{K_e - g} \\ 180 &= \frac{5(1+g)}{0.15 - g} \\ 27 - 180g &= 5 + 5g \\ 27 - 5 &= (180 + 5)g \\ \frac{22}{185} &= 11.89\%.\end{aligned}$$

10. Answer : (a)

Reason : Utility function is always an increasing function of r but at a decreasing rate. Therefore, a utility function's first derivative with respect to r should be positive whereas second derivative should be negative

$$\text{i.e. } \frac{\delta_u(r)}{\delta_r} > 0 \quad \frac{\delta_u^2(r)}{\delta r^2} < 0$$

For a normal level of return of 10 – 12% range, utility function given in option (a) only satisfies the above criteria.

11. Answer : (b)

$$\text{Reason : Discount amount} = \frac{91}{365} \times 100 \times \frac{3.5}{100} = 0.8726$$

$$\text{Selling price of T-bill} = 100 - 0.8726 = \text{Rs.}99.13.$$

12. Answer : (c)

Reason : Moving average price on 9th day

$$\begin{aligned}&= \frac{38 + 40 + 38 + 42 + 41 + 39}{6} \\ &= \frac{238}{6} = \text{Rs.}39.67.\end{aligned}$$

13. Answer : (c)

Reason : Revised value of base year market capitalization

$$\begin{aligned}&\text{Old Base year average} \times \frac{\text{New Market Value}}{\text{Old Market Value}} \\ &= 270.25 \times \frac{(1360 + 302185.25)}{302185.25} \\ &= 271.47 \text{ Crores.}\end{aligned}$$

14. Answer : (c)

Reason : The principles of divergence states that in a bull market the A–D line generally peak ahead of the market index and longer and greater the divergence, the implied divergence may be expected to be deeper and more substantial hence (a) and (b) are correct. At market bottoms the A–D line generally coincides with, or lags behind the market index and has no forecasting significance. Hence (d) is also correct. When the A.D. persistently refuses to confirm a new low in the market a down-trend reversal is must hence (c) is not correct principle.

15. Answer : (e)

Reason : The RSI value always fluctuates between 0 – and 100. Hence (I) is correct. When the RSI indicator crosses the oversold position at 30 from below it is considered as buying signal whereas when it crosses from above it is a selling signal. At overbought position, if RSI indicator crosses from above it is considered as selling signal. Hence (II) and (III) are correct.

16. Answer : (d)

Reason : Treatment of research and development expenditure, gratuity liability and depreciation provision affects the profit figure of a company and valuation of inventories also affects the profit and loss account however revaluation of financial investment for treasury operation only affect the balance sheet and hence (d) is the answer.

17. Answer : (e)

$$\text{Reason : } \beta = \frac{\text{Cov}_{im}}{\sigma_m^2} = \frac{\rho_{im} \sigma_i \sigma_m}{\sigma_m^2} = \rho_{im} \frac{\sigma_i}{\sigma_m}$$

If $\sigma_i < \sigma_m$ then $\beta < \rho_{im}$

as we know that correlation coefficient can have maximum value of 1. Therefore beta will be less than 1.

18. Answer : (c)

Reason : If conversion rate = x

$$\text{Premium over conversion value} = \frac{\text{Bond Price}-\text{Conversion Value}}{\text{Conversion Value}}$$

$$\text{Conversion value} = \text{Conversion rate} \times \text{Stock price}$$

$$3.17\% = \frac{130-14x}{14x}$$

$$0.4438x = 130 - 14x$$

$$x = \frac{130}{14.4438} = 9$$

19. Answer : (e)

Reason : The segmentation market theory states that the shape of the yield curve is dependent on the supply and demand of the securities available within each segment.

20. Answer : (c)

$$\text{Reason : } \% \text{ change in price} = -M.D \times \Delta \text{ YTM}$$

$$= \frac{-D}{1 + \frac{Y}{f}} \times \Delta \text{YTM} = \frac{-6.25}{1.12} \times 0.65\% = -3.627\%$$

$$\text{New price} = 975.25 (1 - 0.03627) = \text{Rs.}939.88$$

21. Answer : (e)

Reason : Growth for 3 years = 25%. During the transition period of 4 years growth rate decreases from 25% and decrease is equal for all the years.

$$\text{Decrease in growth rate} = \frac{25-13}{4} = 3\%$$

Year	Growth rate (%)
1	25
2	25
3	25
4	22
5	19
6	16
7	13

Expected DPS at the end of 6th year = $5.25 \times (1.25)^3 \times 1.22 \times 1.19 \times 1.16 \times 1.13 = \text{Rs.}19.513$.

22. Answer : (e)

Reason : The difference between two futures prices is known as spread. The inter commodity and intra commodity spreads require lower margin vis-à-vis single contracts. The logic behind lower margins is that the prices of futures contract in a spread are usually related and the initial margin which is deposited for a spread covers both the contract of the spread. As a result, the risk of spread is quite low as compared to the risk of a single contract. Basis = Current cash price – Futures price. Generally basis is higher for futures contract with longer maturity. Hence (I), (II) and (IV) are correct and (III) is wrong.

23. Answer : (b)

Reason : Duration and YTM are inversely related and larger the coupon rate smaller the duration of bond. Duration of bond C is 20 years as the bond is zero coupon bond. Duration of bond D will be more than A as coupon rate is lower and duration of bond E is lesser than duration of bond B as YTM is higher although coupon rates are equal. Hence descending order of duration = C, D, A, B, E.

24. Answer : (c)

Reason : The yield curve can be negative during recessionary phase and yield spread between low and high grade corporate bonds tend to widen during a recessionary period in the economy. Hence, both (I) and (II) are false. Riding the yield curve strategy suggests that if the yield curve is upward sloping and if it is projected that the curve will not shift during the investment horizon, then as bond maturities fall with the passage of time their yield are also likely to fall as they ride the yield curve toward the lower yields of short term bonds. The decrease in yield will give higher capital gains of these bonds. Hence, (III) is correct.

25. Answer : (d)

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.

26. Answer : (b)

Reason : During the expansion or consolidation stage, the industry will grow faster than the rest of the economy as the products penetrate and are used more frequently. Hence, (b) is the answer.

27. Answer : (d)

Reason : Constant-growth dividend discount model will be most suitable to value the stock of a firm which is expected to maintain balanced dividend per share. Moderate growth maturity company can provide such dividend and hence most suitable for this model.

28. Answer : (c)

Reason : Presence of Numerous or equally balanced competitors ensures high competition in an industry. Slow growth rate and high fixed or storage cost increase the rivalry among industry players. Lack of differentiation or switching cost also enhances the competition in a particular industry. Hence, (I) and (III) are correct whereas (II) and (IV) are wrong.

29. Answer : (d)

$$\text{Reason : } \sigma_p^2 = W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2 W_A W_B \rho_{AB} \sigma_A \sigma_B$$

$$133 = (0.40)^2 \times (10)^2 + (0.60)^2 \times \sigma_B^2 + 2 \times 0.40 \times 0.60 \times 0.50 \times 10 \times \sigma_B$$

$$133 = 16 + 0.36 \sigma_B^2 + 0.024 \sigma_B$$

$$= 0.36 \sigma_B^2 + 0.024 \sigma_B - 117 = 0$$

$$\sigma_B = \frac{-0.024 \pm \sqrt{(0.024)^2 - 4(0.36)(-117)}}{2(0.36)} = \frac{-0.025 \pm \sqrt{168.48}}{0.72} = \frac{-0.024 + 12.98}{0.072}$$

$$\sigma_B = 18\%$$

30. Answer : (e)

Reason : If a bond is selling at its face value YTM of the bond is equal to its coupon rate and its reinvestment rate. The change in the price of the bond is more when yield decreases by 1% than the change in the price of the bond if yield increases by 1%. Therefore, (I), (II) and (III) are correct.

Part B : Problems (211)

1. This debenture will be desirable by investor if the present value of the cash flows from the debenture is greater than the issue price.

To calculate cash flow from the equity part of the debenture we assume EPS to be Rs.x/share.

Retention ratio 60%

$$\text{Payout ratio} = 1 - 0.60 = 40\%$$

$$\text{DPS} = x \times 0.40 = 0.4x$$

Current growth rate 25%

Growth rate in 7th year and afterwards = 11%. Decline in the growth rate each year

$$= \frac{25-11}{7} = \frac{14}{7} = 2\%.$$

$$\text{Growth for 1st year } 25 - 2 = 23\%$$

$$\text{Growth for 2nd year } 23 - 2 = 21\%$$

$$\text{Growth for 3rd year } 21 - 2 = 19\%$$

$$\text{Growth for 4th year } 19 - 2 = 17\%$$

$$\text{Growth for 5th year } 17 - 2 = 15\%$$

$$\text{Growth for 6th year } 15 - 2 = 13\%$$

$$\text{Growth for 7th year and afterwards } 13 - 2 = 11\%.$$

Dividend for each of the year

Year	Dividend	
1.	$0.4x \times 1.23$	0.492x
2.	$0.492x \times 1.21$	0.595x
3.	$0.595x \times 1.19$	0.708x
4.	$0.708x \times 1.17$	0.828x
5.	$0.828x \times 1.15$	0.952x
6.	$0.952x \times 1.13$	1.075x
7.	$1.075x \times 1.11$	1.193x

Value of stock at the end of 7th year

$$= \frac{D_1}{k_e - g}$$

$$= \left(\frac{1.193x \times 1.11}{0.125 - 0.11} \right) = 88.282x$$

First option

Exchange part B and warrant for one equity share at the end of second year.

Year	Dividend	Interest	Stock/Redemption value	Total inflow	PVIF @ 12.5%	PV of cash flow
1	0.492x	88		$0.492x + 88$	0.889	$0.437x + 78.232$
2	0.595x	88		$0.595x + 88$	0.790	$0.47x + 69.52$
3	$0.708x \times 2$	55		$1.416x + 55$	0.702	$0.994x + 38.61$
4	$0.828x \times 2$	55		$1.656x + 55$	0.624	$1.033x + 34.32$
5	$0.952x \times 2$	55	200	$1.904x + 255$	0.555	$1.057x + 141.525$
6	$1.075x \times 2$	33	200	$2.15x + 233$	0.493	$1.06x + 114.869$
7	$1.193x \times 2$	11	$2 \times 88.282x + 100$	$176.56x + 111$	0.438	$77.33x + 48.618$
						$82.382x + 525.694$

Second Option

Let the warrant lapse. Part B will be redeemed at the end of 7th year.

Year	Dividend	Interest	Stock/Redemption value	Total inflow	PVIF @ 12.5%	PV of cash flow
1	0.492x	88	—	0.492x + 88	0.889	0.437x + 78.232
2	0.595x	88	—	0.595x + 88	0.790	0.47x + 69.52
3	0.708x	88	—	0.708x + 88	0.702	0.497x + 61.776
4	0.828x	88	—	0.828x + 88	0.624	0.517x + 54.912
5	0.952x	88	200	0.952x + 288	0.555	0.528x + 159.84
6	1.075x	66	200	1.075x + 266	0.493	0.53x + 131.138
7	1.193x	44	88.282x + 400	89.475x + 444	0.438	39.19x + 194.472
						42.169x + 749.89

First Option

PV of cash flows = 82.382x + 525.694

Second option

PV of cash flows = 42.169x + 749.89

The minimum EPS for the I option to earn more than Rs.950 in present value terms is the value of 'x' in the following:

$$82.382x + 525.694 \geq 950$$

$$82.382x \geq 950 - 525.694$$

$$x = \frac{424.306}{82.382}$$

$$= \text{Rs.5.15}$$

Similarly in the second option the minimum EPS is value of 'x' in the following:

$$42.169x + 749.890 \geq 950$$

$$42.169x \geq 950 - 749.89$$

$$x = \frac{200.11}{42.169}$$

$$= \text{Rs.4.75}$$

If EPS is greater than Rs.5, investment in the PCD is desirable and as the EPS required is less in option II, option II should be opted by the investor.

2. According to CAPM

$$R_i = R_f + \beta (R_m - R_f)$$

$$R_A = R_f + \beta_A (R_m - R_f) \quad - \text{ (I)}$$

$$R_C = R_f + \beta_C (R_m - R_f) \quad - \text{ (II)}$$

$$(I) - (II)$$

$$R_A - R_C = (\beta_A - \beta_C) (R_m - R_f)$$

$$4 = (1.75 - 0.60) (R_m - R_f)$$

$$4 = 1.15 (R_m - R_f)$$

$$\frac{4}{1.15} = 3.478 = (R_m - R_f)$$

Now putting the value of $(R_m - R_f)$ in equation (I)

$$14 = R_f + 1.75 \times 3.478$$

$$R_f = 14 - 6.087 = 7.913\%$$

$$R_B = 7.913 + 0.82 \times 3.478 \\ = 10.76\%.$$

Total risk = Systematic risk + Unsystematic risk

$$\sigma_B^2 = \beta_B^2 \sigma_m^2 + \sigma_{eB}^2$$

$$(6)^2 = \beta_B^2 \sigma_m^2 + 5$$

$$36 = (0.82)^2 \sigma_m^2 + 5$$

$$(36 - 5) = 0.6724 \sigma_m^2$$

$$\frac{31}{0.6724} = \sigma_m^2$$

$$46.10 = \sigma_m^2$$

$$\sigma_A^2 = 46.10 \times (1.75)^2 + 12 = 153.18$$

$$\sigma_C^2 = 46.10 \times (0.60)^2 + 18 = 34.6$$

$$\sigma_A = 12.38\%$$

$$\sigma_C = 5.88\%.$$

3. a. YTM of the bond

$$950 = 107.5 \times PVIFA_{(k, 6)} + 1000 \times PVIF_{(k, 6)} \\ \text{at } k = 12\%$$

$$\text{R.H.S.} = 948.6$$

at $k = 10.75\%$

$$\text{R.H.S.} = 1,000$$

$$\text{YTM} = 10.75 + 12.5 \times \frac{1000 - 950}{1000 - 948.6} \\ = 11.97\%$$

$$\text{Current yield} = \frac{107.5}{950} = 11.32\%$$

$$\text{Duration} = \frac{r_c}{r_d} (PVIFA_{(k, n)}) \times (1 + k) + \left(1 - \frac{r_c}{r_d}\right) n \\ = \frac{0.1132}{0.1197} \times PVIFA_{(11.97, 6)} (1.1197) + \left(1 - \frac{0.1132}{0.1197}\right) 6 \\ = 0.9457 \times 4.115 \times 1.1197 + 0.3258 \\ = 4.683 \text{ years.}$$

$$\text{b. \% change in price} = -MD \times \Delta y \\ = -\frac{4.683}{1.1197} \times 0.50 \\ = -2.091\%$$

$$\text{New price} = 950 (1 - 0.02091) \\ = \text{Rs.} 930.14.$$

4. Initial Margin = $\mu + 3\sigma = 10,000 + 6000 = 16000$

Maintenance margin = $16,000 \times 0.75 = 12,000$

Day	Change in the futures value (Rs.)	Margin A/C (Rs.)	Call money (Rs.)
4/02/03	–	16,000	–
5/02/03	$50 \times (3294.4 - 3296.50) = -105$	15895	–
6/02/03	$50 \times (3230.40 - 3294.4) = -3200$	12695	–
7/02/03	$50 \times (3272.30 - 3230.40) = -905$	16000	4210
10/02/03	$50 \times (3267.5 - 3212.30) = 2760$	18760	–
11/02/03	$50 \times (3263.80 - 3267.50) = -185$	18575	–
12/02/03	$50 \times (3292 - 3263.80) = 1410$	19985	–
14/02/03	$50 \times (3309.30 - 3292.00) = 865$	20850	–
17/02/03	$50 \times (3257.80 - 3309.3) = -2575$	18275	–
18/02/03	$50 \times (3102.6 - 3257.8) = -7760$	16000	5485

5. Amount contributed to the sinking fund (Half yearly)

$$= \frac{i}{(1+i)^n - 1} = \frac{\frac{0.1075}{2}}{\left(1 + \frac{0.1075}{2}\right)^{16} - 1} = \frac{0.05375}{1.311} = 0.041$$

Interest rate = 0.1075

Total payments for the bonds per half year

$$= 0.041 + (0.1075 \div 2) (1 - 0.30) = 0.0786.$$

$$\text{Annual payment} = (1 + 0.0786)^2 - 1 = 16.34\%$$

Calculation of capitalization rate

Instruments	% employed	Required rate	Weighted Rates
Bonds	60	16.34%	9.804
Equity	40	16%	6.400
			16.204%

a. Capitalization rate = 16.204%

b. M. V. of property = $\frac{100}{0.16204} = 617.13$ lakhs

6. First we should find out abnormal return by deducting the actual return from the expected return

Star Software Limited

Period	Actual return (rSt)	Market return (rmt)	Expected return (%) (1.25 + 0.92 rmt)	Abnormal return
3	11.21	10.25	10.68	0.53
2	11.42	10.75	11.14	0.28
1	12.02	10.90	11.28	0.74
0	11.98	10.80	11.19	0.79
1	12.92	11.25	11.60	1.32
2	12.23	10.92	11.30	0.93
3	12.75	11.15	11.51	1.24

Kanishka Airways

Period	Actual return (r_{Kt})	Market return (r_{mt})	Expected return $1.39 + 1.03 (r_{mt})$	Abnormal return
3	11.78	10.25	11.95	- 0.17
2	12.49	10.75	12.46	0.03
1	13.02	10.90	12.62	0.40
0	12.29	10.80	12.51	- 0.22
1	13.45	11.25	12.98	0.47
2	13.02	10.92	12.64	0.38
3	13.21	11.15	12.87	0.34

Indian Auto

Period	Actual return ($r_{I,t}$)	Market return (r_{mt})	Expected return ($1.78 + 1.07 r_{mt}$)	Abnormal return
3	12.25	10.25	12.75	- 0.50
2	13.25	10.75	13.28	- 0.03
1	13.39	10.90	13.44	- 0.05
0	13.10	10.80	13.34	- 0.24
1	14.25	11.25	13.82	0.43
2	14.01	10.92	13.46	0.55
3	14.19	11.15	13.71	0.48

We will now estimate the average abnormal return to each of the months before and after the dividend was announced

Third month before the announcement of dividend

$$AAR_{(-3)} = \frac{1}{3} (0.53 - 0.17 - 0.50) = - 0.0467$$

Second month before the announcement of dividend

$$AAR_{(-2)} = \frac{1}{3} (0.28 + 0.03 - 0.03) = 0.093.$$

First month before the announcement of dividend

$$AAR_{(-1)} = \frac{1}{3} (0.74 + 0.40 - 0.05) = 0.363$$

Month during which the dividend was announced

$$AAR_{(0)} = \frac{1}{3} (0.79 - 0.22 - 0.24) = 0.11$$

First month after the announcement of dividend

$$AAR_{(1)} = \frac{1}{3} (1.32 + 0.47 + 0.43) = 0.74.$$

Second month after the announcement of dividend

$$AAR_{(2)} = \frac{1}{3} (0.93 + 0.38 + 0.55) = 0.62$$

Third month after the announcement of dividend

$$AAR_{(3)} = \frac{1}{3}(1.24 + 0.34 + 0.48) = 0.686.$$

Now we will compute the cumulative Average Abnormal returns for the period of three months before and after the announcement of dividend.

$$CAAR = (-0.0467 + 0.093 + 0.363 + 0.11 + 0.74 + 0.62 + 0.686) = 2.5653\%.$$

As the value of CAAR is not close to zero, we conclude that market is not efficient in the semi-strong form.

Part C: Applied Theory

7. Several exchanges of the world are preparing to take a step towards demutualization, as others prefer to adopt a wait and watch policy. Sooner or later all the exchanges have to be decisive and answer their mode of survival in times to come. Distinct advantages of demutualization are the single most compelling reason behind the activism.

Access to a wider option of financing is an advantage that any listed company enjoys over an unlisted company and the same is true for a stock exchange, which has chosen to list itself. Such exchanges enjoy from a ready availability of resources and can exploit the technological breakthrough. Secondly, the question of governance. Normally exchanges are associations of members and their primary goal revolves around maximizing their members' interest. Typically, it is seen that the interests of the members are not the same as that of the exchange's. Therefore, by introducing an agency system, the management and exchange can think strategically in terms of maximizing the wealth of their shareholders. Thus better governance is yet another advantage that comes with a demutualized set-up.

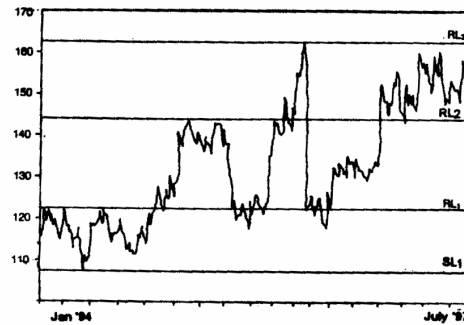
As per a survey conducted on this topic by the London based BTA consulting, exchanges have their own ways and motives of advancing towards demutualization. The result of the survey highlights that profit maximization is not the only criteria that triggers the idea in the minds of the authorities but exchanges demutualize to adapt themselves to the fast changing macro environment. Exchanges also want to effect an organization wide cultural change led by the senior members of the exchange.

With a demutualized setup, the exchange authorities would be answerable to the shareholders with questions on the size of business and profitability of their exchanges. The question arises whether under such pressure will the management of the exchange start undertaking steps like allowing issues with substandard quality to be listed or relaxing their disclosure requirements to attract more listings? Any artificial measure by the regulators to curb such possible steps would nevertheless uphold the sanctity of the markets but that would definitely work against the hosts.

8. Support and Resistance

An important application of trendlines is in identification of support and resistance levels. Resistance is defined by Edward and Magee as 'Selling, actual or potential, sufficient in volume to satisfy all bids and hence stop prices from going higher for a time period'. Support is defined as 'Buying, actual or potential, sufficient in volume to halt a downtrend in prices for an appreciable period'.

A support zone is formed when the demand supply balance tilts in favor of buyers, resulting in a concentration of demand. A resistance zone similarly represents a concentration of supply. The concepts of support and resistance can be illustrated with the help of an example. Consider the following figure which shows the price chart.



The behaviour of prices during January-May does not throw up any price pattern, but the range within which the prices are found to be fluctuating warrants attention. On almost 6 occasions, prices have climbed to the level of Rs.122, and returned. Prices can be observed to face resistance at this level, as every time they reach there, they fail to climb further, but fall back. A trendline drawn to represent this level is called a resistance line (designated RL_1 in the figure).

Similarly, prices have not fallen beyond a level of Rs.110, most of the times they returned from the resistance line. It can be said that a support level exists at which prices have shown a tendency to climb up again, rather than continue to fall. The maximum fall registered is at Rs.106, represents the level at which support has almost invariably occurred. Line SL_1 represents this line of support.

Support and resistance lines are, therefore, trendlines drawn to indicate the ranges a trend can be expected to take, using the past behavior as a reference point. These lines throw up further interesting inferences. When the prices pierce the resistance level RL_1 , it is an indication that buyers have succeeded in breaking the resistance, and prices can be expected to climb up. The new high reached would represent a new level of resistance (represented as RL_2). Prices now are found to fluctuate between the old RL_1 , and the new RL_2 . The point to be noted is that the old resistance line is the new support line, as price receive support at a level almost equal to RL_1 . Similarly prices can be observed to reach a new resistance level RL_3 , and find support at the previous RL_2 .

The support and resistance levels are important tools in confirming a reversal, in forecasting the course of prices, and in making appropriate price moves. The following principles are to be applied while using support and resistance lines for trend analysis:

- i. Support and resistance lines are only approximations of the levels prices may be expected to 'obey'. They should therefore be drawn using judgement, and clues from the past price behavior.
- ii. Penetration of a support or resistance line, also confirmed by an underlying price pattern, is a fairly sure indication of a strong ensuing move in the same direction. New highs are reached after a resistance line is penetrated and new lows follow penetration of a support line.
- iii. Prices are said to remain in a 'congestion zone' as long as they fluctuate in narrow ranges within a support and resistance level. The direction of breakout from a congestion zone cannot be predicted in advance.
- iv. The higher the volume accompanying the confirmation of a support or resistance level, the more its significance.
- v. The speed and extent of the previous move determines the significance of a support or resistance level. Prices penetrate support (resistance) level generally after slowing down from a previous low (high) and hovering around a level for sometime.
- vi. Support and resistance levels repeat their effectiveness time and again, even if separated by many years.