

Question Paper

Security Analysis (211) : July 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. A financial institution has recently issued a bond of face value Rs1000 maturing 10 years hence and bearing a coupon rate of 10% p.a payable semi-annually. Which of the following statements is/are sufficient to determine the realized yield on the bond, if the bond is held till maturity?
 - I. Yield to Maturity (YTM) on the bond is 10%.
 - II. The coupon interests are reinvested at 12%.
 - a. Statement (I) alone is sufficient to answer the question but statement (II) alone is not sufficient
 - b. Statement (II) alone is sufficient to answer the question but statement (I) alone is not sufficient
 - c. Either Statement (I) or Statement (II) alone is sufficient to answer the question
 - d. Both the statements taken together are sufficient to answer the question
 - e. Data inadequate.

2. Consider the following information related to a bond:

Par Value	Rs. 1000
Time to Maturity	20 years
Coupon rate (Interest payable annually)	10%
Current Market Price	Rs. 851
Yield to Maturity (YTM)	12%

Other things remaining the same, if the bond starts paying interest semi-annually, then the change in the market price of the bond will be approximately

- a. - 0.2%
 - b. - 0.1%
 - c. + 0.1%
 - d. + 0.2%
 - e. No change.
3. A support level is the price at which a technical analyst would expect the
 - a. Supply to be static
 - b. Supply of stock to be more than the demand for stock
 - c. Supply of stock to be equal to the demand for stock
 - d. Supply of stock to be nil below that level of price
 - e. Supply to change more than the demand for the stock.
4. A portfolio holding 90 percent of its assets in CNX Nifty stocks in proportion to their market capitalisation and 10 percent in treasury bills is more sensitive to
 - a. Systematic risk
 - b. Unsystematic risk
 - c. Interest rate risk
 - d. Index risk
 - e. Both (c) and (d) above.

5. Standard deviation (σ) and beta (β) both measure risk but they are different in that
- Beta measures only systematic risk whereas standard deviation measures only unsystematic risk
 - Beta measures only unsystematic risk whereas standard deviation measures only systematic risk
 - Beta measures security specific risk whereas standard deviation measures market specific risk
 - Beta measures diversifiable risk whereas standard deviation measures non-diversifiable risk
 - Beta measures only systematic risk whereas standard deviation measures total risk.

6. Consider the following data about two securities A and B:

	Security A	Security B
Expected Return (%)	12	13
Standard deviation of returns (%)	21	29
Beta	1.10	1.20

Variance of returns on the market index is $400 (\%)^2$. The correlation coefficient between the returns on securities A and B is 0.94.

The systematic risk of a portfolio consisting of these two securities in equal proportions is

- $24.63 (\%)^2$
 - $460.00 (\%)^2$
 - $529.00 (\%)^2$
 - $606.73 (\%)^2$
 - $802.40 (\%)^2$.
7. Which of the following statement(s) is/are **true**?
- A unique characteristic line is plotted for each security.
 - For a characteristic line, the x-axis represents betas for different securities.
 - The slope of the characteristic line is the difference between the market returns and risk-free returns.
- Only (I) above
 - Only (II) above
 - Only (III) above
 - Both (I) and (II) above
 - Both (II) and (III) above.
8. The daily closing prices of the stock of Reliance Ltd. for the month of April 2003 are given below:

Day	Closing Prices (Rs.)
2.04.2003	300.30
3.04.2003	278.35
4.04.2003	263.50
5.04.2003	269.40
6.04.2003	244.35
9.04.2003	255.50
10.04.2003	258.05
11.04.2003	265.50

The relative strength of the stock is

- 0.500
- 0.964
- 0.999
- 1.000
- 1.036.

9. Which of the following statement(s) given below most strongly supports the following argument?

Argument: For a given difference between Yield to Maturity (YTM) and Coupon rate of bonds, the longer the term to maturity the greater will be the change in price with change in YTM.

Statements:

- I. Long term bonds are more variable to changes in interest rates than short term bonds.
- II. Short term bonds are more variable to changes in interest rates than long term bonds.
- III. Yield to maturity is inversely related to the price of the bond.

- a. Only (I) above
 - b. Only (II) above
 - c. Only (III) above
 - d. Both (I) and (III) above
 - e. All (I), (II) and (III) above.
10. Consider the following data relating to two bonds selling at par:

	Bond A	Bond B
Yield to Maturity(YTM)	10%	11%
Duration	4 years	2 years.

If YTM increases by 100 basis points for each of the bond, the change in price for the two bonds respectively is

- a. – 3.64% and – 1.80%
 - b. – 3.25% and – 1.67%
 - c. – 1.82% and – 3.64%
 - d. – 1.80% and – 3.64%
 - e. – 1.80% and – 2.80%.
11. Other things being equal call option premiums for a given asset tend to increase when
- a. The price of the underlying asset decreases
 - b. The volatility of the returns on underlying asset decreases
 - c. The time to expiration of the option increases
 - d. The exercise price of the option increases
 - e. None of the above.

12. Consider the following data:

Risk free rate	=	5.6%
Rate for non-liquidity	=	2%
Recapture premium	=	4%
Premium for risk	=	3%

If the net operating income from a property is Rs.30,000 per month, the market value of the property is

- a. Rs.454545
- b. Rs.2054799
- c. Rs.2465753
- d. Rs.4186047
- e. Rs.5454545.

13. The Earnings per share (EPS) of a company registered an increase in the year 2002-2003. Which of the following arguments most seriously weakens this statement?

- I. Book value of Equity has increased.
- II. Debt to Net worth ratio has declined.
- III. Preference capital to Net worth ratio has increased.
- IV. Corporate tax rate has declined.
- V. Rate of return on capital employed(r) and its spread over the interest rate (r-i) has increased.

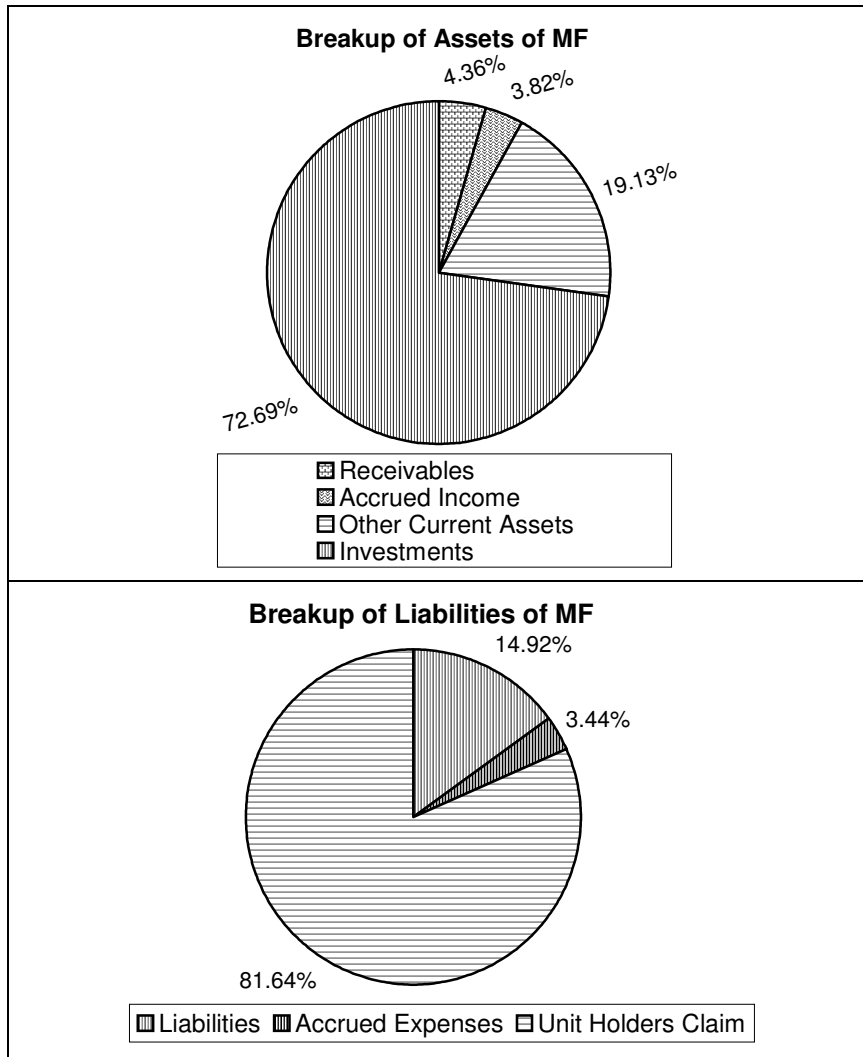
- a. Only (I) above
 - b. Only (II) above
 - c. Only (III) above
 - d. Both (II) and (III) above
 - e. Both (IV) and (V) above.
14. The ex-post SML for a company is given by the equation

$$N(r_i) = 5 + \beta_i 4$$

Which of the following statement(s) is/are sufficient to determine the security's ex-post alpha (α)?

- I. Beta (β) of the security is 1.5.
- II. Actual return on the security is 13.25%.
- a. Statement (I) alone is sufficient but statement (II) alone is not sufficient
- b. Statement (II) alone is sufficient but statement (I) alone is not sufficient
- c. Either Statement (I) or Statement (II) alone is sufficient
- d. Both the statements taken together are sufficient
- e. Data inadequate.

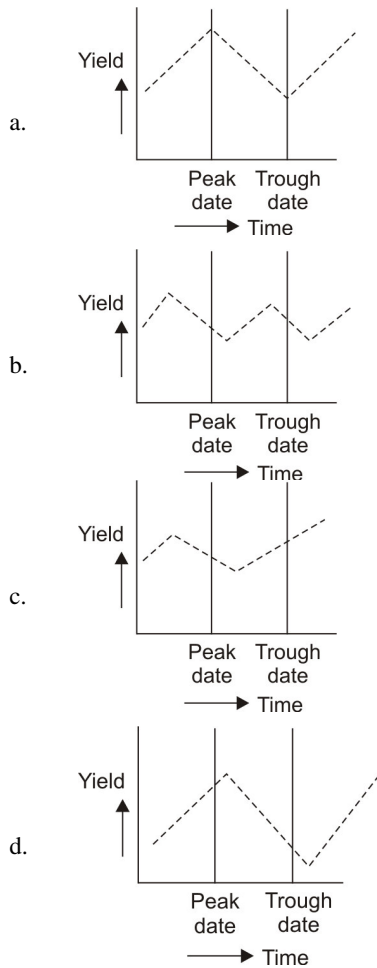
15. The following information is related to the assets and liabilities of JM Mutual Fund:



The accrued expenses and accrued income are Rs. 45 crores and Rs. 50 crores respectively. If the number of outstanding units is 70 crores, the NAV per unit is

- Rs.11.00
 - Rs.12.50
 - Rs.13.67
 - Rs.14.44
 - Rs.15.26.
16. Which of the following statements correctly describes the behavior of yield curve as per the Liquidity Premium hypothesis?
- The yield curve increases at an increasing rate
 - The yield curve increases at a decreasing rate
 - The yield curve decreases at an increasing rate
 - The yield curve first increases at a decreasing rate and then decreases at an increasing rate
 - The yield curve doesn't change with respect to time.

17. Which of the following graphs depicts a lead indicator?



e. Both (b) and (c) above.

18. The dividend growth rate for a firm is 30% and is expected to stabilize at 12% in six years. The current dividend per share is Rs.4.50. If the rate of return expected by shareholders is 15% then the premium due to abnormal growth rate as per H model is

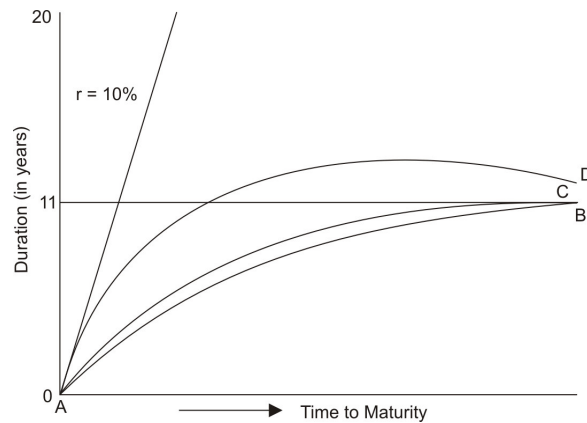
- Rs.81
- Rs.87
- Rs.162
- Rs.168
- Rs.249.

19. Price-Earnings (P/E) ratio of a firm has increased. Which of the following statements supports this fact?

- Growth rate of Earnings has increased.
- Dividend payout ratio has decreased.
- Standard deviation of growth rate in earnings has increased.

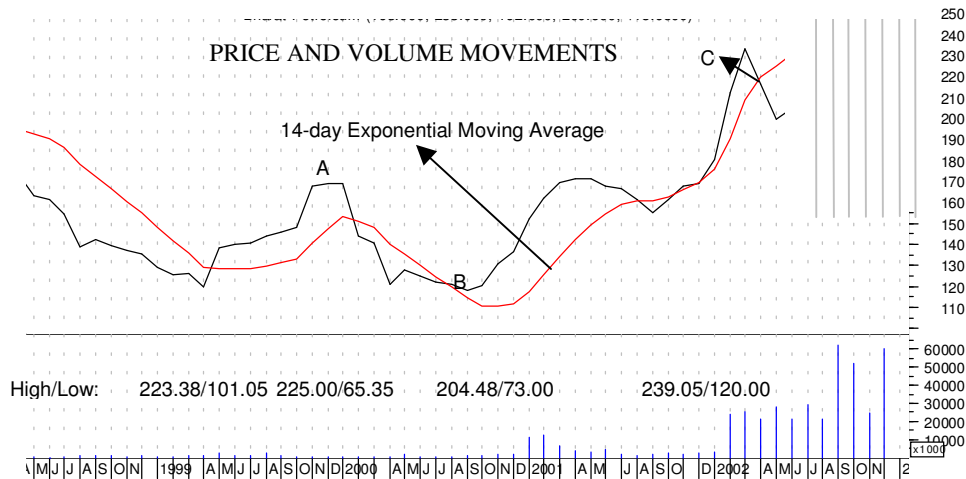
- Only (I) above
- Both (I) and (II) above
- Both (I) and (III) above
- Both (II) and (III) above
- All (I), (II) and (III) above.

20. Using the information provided in the chart given below answer which of the following statements is/are **not true**?



- I. AB denotes a bond selling above its par value.
 - II. AC denotes a bond selling below its par value.
 - III. AD denotes a bond selling at its par value.
- a. Only (I) above
 - b. Only (II) above
 - c. Only (III) above
 - d. Both (I) and (II) above
 - e. Both (II) and (III) above.
21. In a study conducted to test the Efficient Market Hypothesis in its weak form, the first order serial correlation coefficients for 70 (out of 100) shares were found to be significantly different from 0 at 1% level of significance. However the values of the correlation coefficients were very low. This indicates that
- a. Only 3% of the price changes are explained by previous day price changes
 - b. Only 7% of the price changes are explained by previous day price changes
 - c. Only 30% of the price changes are explained by previous day price changes
 - d. Only 70% of the price changes are explained by previous day price changes
 - e. Data inadequate.
22. The average daily price change in coffee futures contract is Rs2.50 per kg and the standard deviation of the price changes is Re 0.50. If the size of the contract is 1000 kgs, the initial margin required is
- a. Rs.1,000
 - b. Rs.2,000
 - c. Rs.3,000
 - d. Rs.4,000
 - e. Rs.5,000.

23. The following chart shows the price and volume movements of Bharat Petroleum Corporation Ltd.



- By looking at point C in this chart, a technical analyst would conclude that
- Prices and volume both are expected to rise, so it is beneficial to buy this stock
 - Prices and volume both are expected to fall, so it is beneficial to sell this stock
 - Prices are expected to rise but volume is expected to fall, so it is beneficial to buy this stock
 - Prices are expected to fall but volume is expected to rise so it is beneficial to wait for the time being
 - Prices are expected to fluctuate in a narrow range, so it is better to hold the stock.
24. An option writer writes a 6-m naked call option on a stock at a premium of Rs.3 and a strike price of Rs150. The prevailing market price of the stock is Rs130. If on the expiration day the price of the stock is Rs140, then the profit/loss to the option writer will be
- Rs10
 - Rs. 3
 - Rs. 7
 - Rs10
 - Rs13.
25. A company has issued warrants which entitle the investors to purchase 100 shares of the company at Rs.65 each. The current market price of the stock is Rs.40 per share and the warrants are trading at Rs.20each. The warrant premium is
- Rs.20
 - Rs.25
 - Rs.40
 - Rs.50
 - Rs.60.
26. A medical research agency in the country concluded after an intensive research that the contents of soft drink concentrates are harmful for bones in the long run. As a security analyst following food and beverages companies, how should you react to this medical report?
- Do nothing until you see that the earnings of a soft drink concentrate manufacturer have actually declined
 - Use the medical report as a basis for reconsidering whether to downgrade any of the soft drink concentrate manufacturing firm that in your opinion are already near the bottom of their quality rating categories
 - Based on the medical report's anticipated impact on the firms in the industry, you should downgrade the quality rating of all firms in the industry
 - You should make a trip to the medical college that published the report and interview the medical researchers to find out their opinion about any additional side-effects of consuming soft drink concentrates that they might be investigating
 - Both (b) and (d) above.

27. Which of the following is a lag indicator?
- Utilization of manufacturing capacity
 - Change in general level of stock prices
 - Residential construction
 - Corporate profits
 - Capital market index.
28. Which of the following is **not** considered as bad delivery in case of shares?
- Transfer deed is mutilated with the signatures of the transferor, witness, directors and officer of the company overwritten/defaced
 - Transfer deeds with correction in the material portion like erasure, overwriting, alteration or crossing out by transferor/authorized signatory but under their full signatures
 - Transfer deeds signed under the Power of Attorney where the power given is subject to conditions
 - Transfer deed signed by an authorized signatory of a custodian and the Power of Attorney registration number is not mentioned on face or the reverse of transfer deed
 - Transfer deeds in respect of joint holdings bearing the signatures of all the joint holders but not in order.
29. Consider the monthly closing prices of major stock market indices in India for the year 2002.

Month	BSE 30	S&P CNX Nifty	S&P CNX 500
January	3311.03	1075.4	714.50
February	3562.31	1142.05	767.60
March	3469.35	1129.55	775.50
April	3338.16	1084.5	771.30
May	3125.73	1028.8	739.55
June	3244.7	1057.8	772.85
July	2987.65	958.9	706.65
August	3181.23	1010.6	737.15
September	2991.36	963.15	691.00
October	2949.32	951.4	691.95
November	3228.82	1050.15	741.55
December	3377.28	1093.5	772.85

- Which of the following statements most accurately describes the relative price behavior of these indices?
- They are significantly perfectly negatively correlated
 - They are mostly, but not always, significantly negatively correlated
 - They are uncorrelated
 - They are mostly, but not always, significantly positively correlated
 - They are significantly perfectly positively correlated.
30. On 20/04/03 HLL opened at Rs143.75. Mr. Ajay Nagpal who is having 100 shares of HLL placed a Stop-Loss order to sell 100 shares at Rs140.00. At the end of the trading on the same day, the loss that Mr. Ajay will suffer if the price of HLL drops to Rs138.50 will be
- Rs.262.00
 - Rs.375.00
 - Rs.525.00
 - Rs.535.00
 - Data not sufficient.

END OF PART A

Part B : Problems (50 Points)

- This part consists of questions with serial number 1 - 6
- 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. An investor writes a naked call option as well as a naked put option on NSE as per the details given below:

Option Type	Stock	Expiring on	Strike Price (Rs)	Option Premium/ share (Rs)	Number of shares/ contract	Current Market Price of stock (Rs)
Call	IPCL	24/07/2003	95	2.30	2200	83.65
Put	TISCO	24/07/2003	125	9.00	1800	128.65

You are **required** to calculate the margin that the investor has to deposit with the brokerage firm.

(6 points)

2. The expected growth rate of dividends for a firm is 11 percent. The sensitivity of growth rate to changes in real interest rate is 0.6 and the sensitivity of growth rate to changes in expected rate of inflation is -0.3. The change in nominal interest rate and the inflation component of interest rate is 100 basis points and 50 basis points respectively.

Using the **Analytical Model for duration of equity** you are **required** to calculate the percentage change in price of stock as a result of given expected change in nominal interest rate and inflation component of nominal interest rate.

Assume that the rate of return required by investors is 15% p.a.

(5 points)

3. Data for 7-day trends of Group A scrips of BSE is given below:

Day	Advances	Declines	Total number of Issues traded
1	100	68	174
2	92	89	186
3	98	96	198
4	87	78	174
5	56	124	188
6	65	98	169
7	98	89	194

You are **required** to:

- Calculate Short period A-D line.
- Calculate Long period A-D line.
- Explain in what way the two lines provide different information?

(2 + 4 + 2 = 8 points)

4. The abridged financial statements of Deccan Paints Ltd. for the years 2001-2002 and 2002-03 are given below:

(Rs in millions)

Profit and Loss A/c	2001-2002	2002-2003
Sales	15260	16600
Operating Profit	1931	2086
Depreciation	316	418
Interest Expense	221	146
Profit Before Tax	1394	1522
Tax	495	661
Profit After Tax	899	861
Dividends	449	578
Balance Sheet		
Fixed Assets	3724	3819
Total Assets	8195	8235
Total Debt	4083	4129
Net Worth	4112	4106
Equity Capital	642	642
No. of Shares	64.2	64.2

You are **required** to

- Perform a Du Pont analysis for 2001-2002 and 2002-2003 by calculating the relevant ratios. Also comment on the factors leading to a change in ROE.
- Calculate the sustainable growth rate of ROE for 2002-2003 assuming that no external financing is resorted to.
- The intrinsic value of the share of Deccan Paints Ltd may be represented by the following model:

$$P_0 = 200 + 0.30 P_{P/E} + 0.60 P_{DDM} + 0.10 P_{BV}$$

Where $P_{P/E}$ = Price as per the P/E approach.

P_{DDM} = Price as per Dividend Discount Model

P_{BV} = Book Value per share

The market price of the share as on 1st April, 2003 was Rs330. Was the share correctly priced?

(4 + 4 + 7 = 15 points)

5. Consider the following information about four stocks:

Stock	Expected Return (%)	Standard Deviation (%)
HCL	5	20
Satyam	10	10
Reliance	20	15
Infosys	15	30

The coefficient of correlation between the returns on the four stocks is given in the matrix below:

Stock	HCL	Satyam	Reliance	Infosys
HCL	1.00	-0.2	0.3	0.5
Satyam	-0.2	1.00	0.2	-0.5
Reliance	0.3	0.2	1.00	0.6
Infosys	0.5	-0.5	0.6	1.00

A portfolio is constructed by buying Rs10,000 worth of HCL, Rs15,000 worth of Satyam, Rs30,000 worth of Reliance and Rs25,000 worth of Infosys. The investor provided Rs30,000 and leveraged the portfolio for the remaining amount by borrowing at a risk free rate of 5.6% p.a.

You are **required** to

- Compute the expected return of the portfolio.
- Compute the standard deviation of the portfolio.

(6 + 4 = 10 points)

6. The following is the information related to a bond issued by a firm:

Date of Issue	Years to Maturity	Face Value (Rs.)	Coupon Rate (%)
01.04.2003	6	1000	9

The bond will be redeemed at its face value and coupon is paid annually. The bond is currently trading at Rs.976.95.

You are **required** to:

- Calculate the duration of the bond.
- Calculate the percentage change in the price of the bond if the yield increases by 50 basis points.

(3 + 3 = 6 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. Transfer of shares in secondary market takes place through broker and depositories. Can we call the transfer “a contract” as per the basic principles of Indian Contract Act, 1872. Discuss.
- (10 points)**
8. Mr. Ruchir Sharma, Managing Director, Morgan Stanley Investment Management (India) recently said in an interview that the three cornerstones of investment philosophy are valuations, dynamics, and sentiment. As a Security Analyst, discuss the role these factors play in evaluating the investment worthiness of a stock.

(10 points)

END OF PART C

END OF QUESTION PAPER

Suggested Answers

Security Analysis (211) : July 2003

Part A : Basic Concepts

1. Answer : (b)
Reason : The realized yield depends upon the rate at which coupon interests are reinvested. Statement I tells that the YTM on the bond is 10% but doesn't tell anything about the reinvestment rate. Though in the ytm calculation, there is an inherent assumption that coupon interests are reinvested at a rate equal to ytm. However, the reinvestment rate may be different in reality. Statement II tells us that coupon interests are reinvested at 12%. This information can be used to calculate the realized yield. Hence the correct answer is (b).
2. Answer : (a)
Reason : The equation expressing the relationship between Market Price of the bond and YTM is as follows

$$P_o = C_o \times PVIFA_{(k, n)} + F \times PVIF_{(k, n)}$$
Substituting the given values in the equation, we get

$$Po = 50 \times PVIFA_{(6\%, 40)} + 1000 \times PVIF_{(6\%, 40)}$$

$$= 50 \times 15.046 + 1000 \times 0.097 = 849.30$$
Therefore, the change in market price = $(849.30 - 851)/851 = -0.199\% = -0.2\%$
Hence the correct answer is (a).
3. Answer : (d)
Reason : A support level is one below which the price of a stock cannot fall. As soon as the price line reaches this level, it turns around and rallies upwards. This is possible only when the supply of the stock is nil below that price level. Hence the correct answer is (d).
4. Answer : (a)
Reason : Investing in CNX Nifty stocks in proportion to their market capitalization means investing in the market portfolio. The investment in market portfolio is affected by the market movements. If the markets rise, the portfolio gains and vice-versa. The portfolio will be affected positively or negatively by the market and the portfolio will be more sensitive to systematic risk. Hence the correct answer is (a).
5. Answer : (e)
Reason : Beta measures the responsiveness of the stock to changes in the returns on the market index whereas standard deviation measures the total risk i.e both systematic or market risk and the unsystematic risk or firm specific risk. Hence the correct answer is (e).
6. Answer : (c)
Reason : The beta of the portfolio consisting of two securities given that money is allotted equally between the two assets = $1.1 \times 0.5 + 1.2 \times 0.5 = 1.15$
The systematic risk of a portfolio = $\beta^2 \sigma_m^2$
Substituting the values, we get
 $(1.15)^2 \times 400 = 529(\%)^2$. Hence the correct answer is (c)
7. Answer : (a)
Reason : A characteristic line shows the relationship between returns on market index (y-axis) and the returns on the stock (x-axis). Each stock has a unique characteristic line obtained by regressing the stock returns on the market returns. Hence the correct answer is (a).
8. Answer : (d)
Reason : The Relative strength =
$$\frac{\text{Average of Up Closing Prices}}{\text{Average of Down Closing Prices}}$$

Substituting the corresponding values, we get

$$\frac{(269.04 + 255.50 + 258.05 + 265.50)/4}{(278.35 + 263.50 + 244.35)/3} = \frac{262.11}{262.07} = 1.0001 \text{ i.e., } 1.000$$

Hence the correct answer is (d).

9. Answer : (d)

Reason : In case of long maturity bonds a change in YTM is cumulatively applied to the entire series of the coupon payments and the principal payment is discounted at the new rate for the entire number of years to maturity; whereas in case of short term maturity bonds, the new YTM is applied to comparatively few coupon payments and also principal payment is discounted for only a short period of time. Thus long term bonds are more variable to changes in interest rates than short term bonds. This is so because the YTM is inversely related to the price of the bond. Hence the correct answer is (d).

10. Answer : (a)

Reason : The change in price of a bond for a given change in YTM is given by the following expression

$$\text{Substituting the } \frac{\Delta P}{P} = -D \times \frac{\Delta \text{YTM}}{1 + \text{YTM}} \text{ given values,}$$

For Bond A

$$4 \times 1/1.10 = -3.64 \%$$

For Bond B

$$2 \times 1/1.11 = -1.80 \%$$

Hence the correct answer is (a).

11. Answer : (c)

Reason : The time to expiration is directly related to the option premium. Longer the time to expiration, higher is the option premium. Thus, other things being equal, call option premiums for a given asset tend to increase when the time to expiration increases.

12. Answer : (c)

Reason : As per the Built-Up method for valuation of real assets, the capitalization rate is given by the following expression

$$\text{Capitalization Rate (R)} = \text{Risk-free rate} + \text{Rate for Non-liquidity} + \text{Recapture Premium} +$$

Rate for risk

Market Value of the

$$\text{Property} = \frac{\text{Net Operating Income}}{\text{Capitalization Rate}}$$

Substituting the given values, we get

$$\text{Capitalization Rate} = 0.056 + 0.02 + 0.04 + 0.03 = 0.146 = 14.6\%$$

$$\text{Net operating Income from the property} = \text{Rs}30000 \times 12 = \text{Rs.}3,60,000$$

$$\text{Market Value of the Property} = \frac{3,60,000}{0.146} = \text{Rs.}24,65,753.$$

Hence the correct answer is (c).

13. Answer : (b)

Reason : The Earnings Per Share (EPS) is given by the following formula

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

This suggests that if EPS has increased, debt to networth ratio cannot decline as EPS is positively related to this ratio. Other arguments support the statement as can be seen from the formula. Hence the correct answer is (b).

14. Answer : (d)

Reason : The ex-post alpha of a security measures the abnormal returns earned on the security given its risk. In order to calculate this, we need to know the normal return and the actual return on the security. The normal return can be calculated using ex-post SML if we know the beta (β) of the security. Thus, using Statement I we can compute the normal return and compare it with actual return which is provided in Statement II.

Hence the correct answer is (d).

15. Answer : (e)

Reason : Using the pie-chart for break-up of assets of mutual fund, we can calculate the value of total assets as follows:

Total Assets of the fund = Accrued Income/% of accrued income in total assets
= $50/0.0382 = 1308.9$

$$\text{NAV} = \frac{\text{Unit holders Claim}}{\text{Number of Units}} = 1308.9 \times 0.8164/70 = 1068.59/70 = \text{Rs}15.26$$

Hence the correct answer is (e).

16. Answer : (a)

Reason : According to the liquidity premium theory the investors are risk averse and charge higher rates than the expected future rates, if the maturity increases. Thus, irrespective of the changes in the future interest rates, the liquidity premium will increase at a fast pace along with maturity and the yield curve will be an upward sloping one.

17. Answer : (c)

Reason : A lead indicator is one which peaks out well before the economy peaks and bottoms out well before the economy does. Economists use these indicators for forecasting trends in the economy. Graph C clearly depicts this behavior and hence reflects a lead indicator. Graph B also appears to depict a lead indicator but a closer examination reveals that it is not giving crystal clear signals. Hence the answer is (c).

18. Answer : (a)

Reason : As per H Model,

$$P_o = \frac{D_o ((1 + g_n) + H(g_a - g_n))}{r - g_n}, \text{ where the notations are in their standard use.}$$

$$\text{The premium due to abnormal growth rate} = \frac{D_o H(g_a - g_n)}{r - g_n}$$

Substituting the corresponding values, we get

$$\text{Premium due to abnormal growth rate} = 4.5 \times 3 (0.30 - 0.12)/0.15 - 0.12 = \text{Rs } 81$$

Hence the correct answer is (a).

19. Answer : (a)

Reason : As per the Dividend Discount Model,

$$\frac{P_o}{E_o} = \frac{(1 + g)(1 - b)}{K_e - g} \text{ where symbols have been used in their standard notation.}$$

So, P/E ratio can increase only if the dividend payout ratio increases or the earnings growth rate increases. Increase in standard deviation of growth will only lead to increased uncertainty and so it will result in a decrease in P/E ratio.

The same is clear from Whitbeck and Kisor Model.

As per the Whitbeck and Kisor model

$$P/E = a + bEG + cDP - dSD$$

Where $a = P/E$ ratio when it is assumed to be unaffected by growth in equity, dividend payment and variability of earnings growth.

EG = growth rate in earnings

DP = dividend pay-out

SD = standard deviation of growth rate in earnings.

From the model it is clear that if dividend payout ratio will increase and standard deviation of earnings will increase P/e ratio can only decline. Hence only statement I supports the fact that P/E ratio has increased. Hence correct answer is (a).

20. Answer : (e)

Reason : As the maturity of a coupon bearing bond is lengthened, the duration also increases although at a slower rate. The duration of a bond selling below par tends to increase with an increase in the term to maturity. It reaches its highest point before the term to maturity reaches infinity and then recedes to the value $(1+YTM)/YTM$ as bonds selling at or above par. So only statement I is true. Hence, the correct answer is (e).

21. Answer : (c)

Reason : According to the weak form of EMH investors cannot reap abnormal profits by observing the historical data of stock prices as they follow a random path. The serial correlation test is used to examine this. If the coefficient of correlation is close to zero it confirms the weak form of market efficiency. In this case, though the serial correlation coefficients were found to be significantly different from zero at 1% level of significance, there values were very low in 70% of the cases. This indicates that only in the remaining 30% cases the price changes are explained by the previous day price changes. Hence the correct answer is (c).

22. Answer : (d)

Reason : The margin depends on the price volatility of the underlying. Exchanges generally set this margin equal to

$$\text{Margin} = \mu + 3\sigma$$

Where μ is the average daily absolute change in the value of the contract and σ is the standard deviation of these changes measured over a period of time.

Substituting the given values, we get

$$\text{Margin} = 2.50 \times 1000 + 3 \times 0.5 \times 1000 = 2500 + 1500 = 4000.$$

Hence the correct answer is (d).

23. Answer : (d)

Reason : At point C, which is the point of cross over of EMA and price line, the price line is moving downwards whereas the EMA is moving upwards. It is expected that the prices will continue to continue downwards and the volumes will increase. So it is beneficial hold the stock and watch the further movements. Hence the correct answer is (d).

24. Answer : (b)

Reason : The call option writer has no option to exercise or not to exercise the option contract. This facility is available to the buyer in lieu of the premium paid. In this case as the market price of the underlying stock is less than the strike price, the call option buyer will not exercise the contract. So the profit available to the writer will only be the premium received. Hence the answer is (b).

25. Answer : (a)

Reason : The difference between the warrant price and the minimum value of the warrant is called as the warrant premium. If the current market price of the stock P_s is greater than the exercise price P_e , the minimum value is given by $(P_s - P_e) \times N$. When the current market price of the stock is less than the exercise price, the minimum value is zero.

In this case since the current market price of the stock is less than the exercise price, the minimum value of the warrant is zero. Therefore the warrant premium will be Rs 20. Hence the correct answer is (a).

26. Answer : (b)

Reason : The security analysts are expected to go beyond the obvious and try to dig out the hidden information which may have impact on valuation of firms. In this case as the report of the medical research agency says that the soft drink concentrates are harmful for bones in the long run, this information is going to have an impact on the profitability of the companies in this industry. So first of all as a security analyst you should consider whether there are any

companies which are already near the bottom of quality ratings and downgrade them as they will be the first to get affected as a result of this report. Hence the correct is (b).

27. Answer : (e)

Reason : Utilization of manufacturing capacity, change in general level of stock prices, residential construction, corporate profits all are lead indicators. Market index is the only lag indicator as it confirms the upturn or downturn once it has occurred. Hence the correct answer is (e).

28. Answer : (b)

Reason : In this case though there are corrections in the material portion but these changes/ corrections are under their full signatures. Hence this is not a case of bad delivery. In all other cases, it is considered bad. Hence the correct answer is (b).

29. Answer : (d)

Reason : By looking at the movements of the three indices we can notice that their movements are significantly positively correlated most of the times. Hence the correct answer is (d).

30. Answer : (b)

Reason : Stop- loss order is an order to sell if price is to fall below a certain specified level. In this case, Mr. Ajay has placed a stop-loss order at Rs140. The order will thus be executed at this price.

Therefore, Loss = $(143.75 - 140.00) \times 100 = \text{Rs.}375$. Hence the answer is (b).

Part B : Problems (211)

1. Both the call option and the put option are out of the money options. The margin to be deposited shall be calculated as follows:

Call Option:

First Method

$$2.30 \times 2200 + 0.20 \times 83.65 \times 2200 - 2200 \times (95 - 83.65) = \text{Rs}16896$$

Second Method

$$2200 \times 2.3 + 0.10 \times 83.65 \times 2200 = \text{Rs}23463$$

The initial margin required is the higher of the two i.e Rs23463

Put Option:

First Method

$$9 \times 1800 + 0.20 \times 128.65 \times 1800 - 1800 (128.65 - 125) = \text{Rs}55944.$$

Second Method

$$1800 \times 9 + 0.10 \times 128.65 \times 1800 = \text{Rs}39357$$

The initial margin required is the higher of the two i.e Rs55944

The total margin to be deposited by the investor = Rs.(23463 + 55944) = Rs79407.

2. As per the Analytical model for duration of equity

Duration of the stock according to DDM

$$= \frac{1}{(k - g)} = 1/(0.15 - 0.11) = 25 \text{ years.}$$

$$\frac{\Delta P}{P} = -D(1 - G) \Delta_i - D(1 - I) \Delta_r$$

Where the notations are in their standard use

We have,

$$D = 25, I = -0.3, G = 0.6, I_r = 0.5, \Delta_i = 1\%.$$

Substituting the corresponding values in the analytical model we get,

$$= -25(1 - 0.6)1.00 - 25 \times 1.30 \times 0.5 = -26.25\%$$

3. a. Short-period A-D line:

For short-period observations A/D lines do not account for unchanged stocks.

Day	Issues Traded	Advances	Declines	Net (A-D)	Cumulative(A-D)
1	174	100	68	32	32
2	186	92	89	3	35
3	198	98	96	2	37
4	174	87	78	9	46
5	188	56	124	-68	-22
6	169	65	98	-33	-55
7	194	98	89	9	-46

- b. Long-period A-D line:

For long run observations, the A-D line is drawn after considering those stocks also whose price remain unaltered. The A-D line is drawn by cumulating the value of A/U-D/U.

(1) Issues Traded	(2) Advances	(3) Declines	(4) Unchanged	(5) (2)/(4) × 100	(6) (3)/(4) × 100	(7) (5) - (6)	(8) $\sqrt{(5) - (6)}$	(9) Cumulative A-D
174	100	68	6	1666.67	1133.33	533.33	23.09	23.09
186	92	89	5	1840.00	1780.00	60.00	7.74	30.83
198	98	96	4	2450.00	2400.00	50.00	7.07	37.90
174	87	78	9	966.67	866.67	100.00	10.00	47.90
188	56	124	8	700.00	1550.00	-850.00	-29.15	18.75
169	65	98	6	1083.33	1633.33	-550.00	-23.45	-4.70
194	98	89	7	1400.00	1271.4	128.57	11.34	6.64

- c. Both the lines are used for analysis of the extent of a trend. The major differences are:
- As the name suggests, the long period A-D line indicates the extent of trend or the breadth of market over a long period.
 - The long period A-D line includes the issues whose prices remain unchanged. This provides additional information on the market following a certain trend and can also indicate in advance a trend reversal.

4. a. Du Pont Analysis of Deccan Paints Ltd. For the two years can be done as follows:

Particulars	2001-2002	2002-2003
Sales	15260	16600
PAT	899	861
TA	8195	8235
Total debt	4083	4129
Return on Total Assets (%)	10.97	10.46
Net Profit Margin (%)	5.89	5.19
Total Assets Turnover	1.86	2.02
Debt-Asset Ratio	0.50	0.50

The ROE as per the Du Pont Analysis is given by the following:

$$\frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{TA}} \times \frac{1}{(1 - \text{DAR})}$$

Substituting the values, we get

Year 2001-2002

$$\text{ROE} = 5.89 \times 1.86 \times 1/(0.50) = 22.26\%$$

Year 2002-2003

$$\text{ROE} = 5.19 \times 2.01 \times 1/0.5 = 20.86\%$$

Net Profit Margin has fallen by 11.9% whereas the asset turnover has increased by 7.5% as a result of which the ROE has fallen by 1.4%.

- b. The sustainable growth rate without raising any external finance is given by the following formula

$$g = \frac{m(1-d)A/E}{A/S_0 - m(1-d)A/E}$$

For Deccan Paints, for the year 2002-2003

$$m = 0.0519, d = 578/861 = 0.67, A/E = 8235/4106 = 2.01, A/S_0 = 8235/16600 = 0.5$$

Substituting the values in the formula, we get

$$g = \frac{0.0519(1-0.67) \times 2.01}{0.5 - 0.0519(1-0.67) \times 2.01} = 0.0739 = 7.39\%$$

- c. Price of the share of Deccan Paints Ltd. as per the P/E approach can be calculated as follows:

According to DDM

$$P_0 = \frac{D_1}{k_e - g} \Rightarrow P_0 = \frac{E_0(1+g)(1-b)}{k_e - g}$$

$$\frac{P_0}{E_0} = \frac{(1+g)(1-b)}{k_e - g}$$

We have $g = 7.4\%$ $b = 0.50$ $k_e = 12\%$.

Substituting the values, we get

$$P/E = \frac{(1.074)(1-0.5)}{0.12 - 0.074} = 11.67$$

$$EPS = \frac{PAT}{N} = \frac{899}{64.2} = 14.00$$

$$\therefore \text{Price} = P/E \times EPS = 11.67 \times 14 = \text{Rs.}163.38$$

Price of the share as per Dividend Discount Model will be as follows:

$$P_0 = \frac{D_1}{k_e - g} = \frac{D_0(1+g)}{k_e - g} = \frac{6.99 \times 1.074}{0.12 - 0.074} = 163.20.$$

$$\text{Book value of the share} = \frac{\text{Networth}}{N} = \frac{4112}{64.2} = 64.05$$

Substituting the corresponding values in the given model we get

$$\begin{aligned} P &= 200 + 0.30 \times 163.38 + 0.60 \times 163.20 + 0.10 \times 64.05 \\ &= 200 + 49.01 + 97.92 + 6.40 \\ &= \text{Rs.}353.33 \end{aligned}$$

The price on 1st April 2003 was Rs.330 which is only marginally less than intrinsic value and is in the same range. So it can said to be correctly priced.

5. a. The proposed investment in various stocks is as follows:

HCL	Rs10,000
Satyam	Rs15,000
Reliance	Rs30,000
Infosys	Rs25,000

The total funds required are Rs. 80,000. He provides Rs30,000 and borrows the remaining Rs50,000 @5.6%.

The weightage of various investments in the portfolio will be

$$\begin{aligned} \text{HCL} &= 10,000/30,000 = 1/3 \\ \text{Satyam} &= 15,000/30,000 = 1/2 \\ \text{Reliance} &= 30,000/30,000 = 1 \\ \text{Infosys} &= 25,000/30,000 = 5/6 \\ \text{Borrowings} &= -50,000/30,000 = -5/3 \end{aligned}$$

$$\text{Expected return on the portfolio} = W_1E_1 + W_2E_2 + W_3E_3 + W_4E_4 + W_5E_5$$

$$\text{Expected return} = 1/3 \times 5 + 1/2 \times 10 + 1 \times 20 + 5/6 \times 15 - 5/3 \times 5.6 = 29.84\%$$

- b. The variance of the portfolio consisting of four assets is given by (Since borrowings are risk free so σ_s^2 will be zero)

$$\begin{aligned}\sigma_P^2 = & \sigma_1^2 W_1^2 + \sigma_2^2 W_2^2 + \sigma_3^2 W_3^2 + \sigma_4^2 W_4^2 + 2W_1W_2\sigma_1\sigma_2\rho_{1,2} + 2W_1W_3\sigma_1\sigma_3\rho_{1,3} \\ & + 2W_1W_4\sigma_1\sigma_4\rho_{1,4} + 2W_2W_3\sigma_2\sigma_3\rho_{2,3} + 2W_2W_4\sigma_2\sigma_4\rho_{2,4} + 2W_3W_4\sigma_3\sigma_4\rho_{3,4}\end{aligned}$$

Substituting the given values, we get

$$\begin{aligned}\sigma_P^2 = & 400 \times \left(\frac{1}{3}\right)^2 + 100 \times \left(\frac{1}{2}\right)^2 + 225 \times (1)^2 + 900 \times \left(\frac{5}{6}\right)^2 + 2 \times \frac{1}{3} \times \frac{1}{2} \times 20 \times 10 \times (-0.2) + 2 \times \frac{1}{3} \times 1 \\ & \times 20 \times 15 \times (0.3) + 2 \times \frac{1}{3} \times \frac{5}{6} \times 20 \times 30 \times (0.5) + 2 \times \frac{1}{2} \times 1 \times 10 \times 15 \times (0.2) + 2 \times \frac{1}{2} \times \frac{5}{6} \times 10 \times 30 \\ & \times (-0.5) + 2 \times 1 \times \frac{5}{6} \times 15 \times 30 \times 0.6 \\ = & 44.44 + 25 + 225 + 625 - 13.33 + 60 + 166.67 + 30 - 125 + 450 = 1487.78. \\ \therefore \sigma_P = & \sqrt{1487.78} = 38.57\%.\end{aligned}$$

6. a. The yield to maturity of the bond can be calculated as follows:

$$976.95 = 90 \times \text{PVIFA}(r_d, 6) + 1000 \times \text{PVIF}(r_d, 6)$$

Where r_d = yield to maturity

At $r_d = 9\%$

$$\begin{aligned}\text{R.H.S.} &= 90 \times 4.486 + 1000 \times 0.596 \\ &= 403.74 + 596 = 999.74.\end{aligned}$$

At $r_d = 10\%$

$$\begin{aligned}\text{R.H.S.} &= 90 \times 4.355 + 1000 \times 0.564 \\ &= 391.95 + 564 = 955.95.\end{aligned}$$

Interpolating, we get

$$\begin{aligned}r_d &= 9\% + \frac{999.74 - 976.95}{999.74 - 955.95} \\ &= 9\% + \frac{22.79}{43.79} = 9.52\% \approx 9.5\%\end{aligned}$$

$$\begin{aligned}\text{Current yield of the bond (rc)} &= \frac{\text{Coupon Interest}}{\text{Market Price}} \\ &= \frac{90}{976.95} = 9.21\%\end{aligned}$$

Duration of the bond

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

Where symbols are in standard use.

$$\begin{aligned}\text{Duration} &= \frac{0.092}{0.095} \times \text{PVIFA}(9.5, 6) \times (1.095) + \left(1 - \frac{0.092}{0.095}\right)6 \\ &= 0.968 \times 4.420 \times (1.095) + (0.189) \\ &= 4.87.\end{aligned}$$

$$\begin{aligned}\text{b. Modified Duration} &= \frac{D}{1 + \frac{r_d}{f}} \quad \text{Where } f = \text{Number of discounting periods} \\ &= \frac{4.87}{1.095} = 4.45\end{aligned}$$

$$\frac{\Delta P}{P} \times 100 = -D_{\text{Mod}} \cdot \Delta y$$

$\therefore$ the percentage change in price of the bond

$$= -4.45 \times 0.5 = -2.23\%$$

The price of the bond will decrease by 2.23%.

Part C: Applied Theory

7. Transfer of shares being in the nature of a contract must have two parties. Transfer of shares must also fulfill the basic principles of Indian Contract Act, 1872 (viz. valid contract, lawful consideration, lawful object, mutual consent, a valid offer and acceptance, capacity to contract etc.)

Given this, the transfer of shares though it takes place through brokers and depositories is still a contract. However, as the law stands today, until the transfer is approved by the board of Directors or a committee of the Board and the name of the transferee is entered in the Register of Members, the ownership rights will not be recognized by the company.

8. These are indeed the cornerstones of investment philosophy. Valuations though important are not the crucial drivers. Valuations are the easiest to analyze. The market knows what the valuations are as they are published. Even otherwise they can be calculated or subjectively interpreted.

Dynamics play a very important role, wherein you need to articulate what are the drivers, catalysts or triggers for a particular stock or market and how they move in a particular direction.

Sentiment is a very good reality check. If you are doing something that the consensus is already doing, you are likely to be caught in a herd and get stampeded in the process. So from a contrarian standpoint, knowledge of market sentiment is important. Sentiment unfortunately is a subjective tool. The implications of sentiment vary across asset classes. While sentiment is an important criterion for equity and bond markets, it is not as relevant in the currency markets.