

Question Paper

Security Analysis - I (MSF2D1): October 2008

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. High yield bonds issued by companies and are considered highly speculative because of high risk of default is called [<Answer>](#)
 - (a) Secured bonds
 - (b) Registered bonds
 - (c) Indexed bonds
 - (d) Corporate bonds
 - (e) Junk bonds.

2. Which of the following statements is/are **false** according to Efficient Market Hypothesis (EMH)? [<Answer>](#)
 - I. According to EMH, successive absolute short run price changes are dependent.
 - II. The hypothesis is based on the assumption that the market comprises of rational investors.
 - III. EMH in fundamental analysis is entirely in agreement with the upward or downward change in trends since only the short run price changes are random and not the price trend themselves.
 - IV. Under weak form of EMH the current prices fully reflect all historical information.
 - (a) Only (I) above
 - (b) Only (IV) above
 - (c) Both (I) and (III) above
 - (d) Both (II) and (IV) above
 - (e) (I), (II) and (III) above.

3. A debenture of face value of Rs.100 carries an interest rate of 12% p.a. is redeemable after 5 years, at a premium of 4%. If the present value of the debenture is Rs.81.62, the required rate of return is [<Answer>](#)
 - (a) 17.23%
 - (b) 18.50%
 - (c) 19.34%
 - (d) 20.28%
 - (e) 21.71%.

4. Mr. Damodar Reddy has a property in Hyderabad whose current market value is Rs.60,48,148. The net operating income from the property is Rs.7,00,000. If the net operating income is growing at a rate of 4.5% p.a., the required rate of return is approximately [<Answer>](#)
 - (a) 12.71%
 - (b) 13.82%
 - (c) 14.66%
 - (d) 15.30%
 - (e) 16.07%.

5. The formation of an isolated price pattern usually within a narrow range at the end of a price trend is referred to as [<Answer>](#)
 - (a) Flags
 - (b) Saucers
 - (c) Islands
 - (d) Triangles
 - (e) Head and shoulders.

6. Which of the following is **not** a major source of exit barrier in structural analysis? [<Answer>](#)
 - (a) Specialized assets
 - (b) Emotional barriers
 - (c) Strategic interrelationships
 - (d) Economies of scale
 - (e) Government and social restrictions.

7. The current market price of a convertible bond is Rs.278 and that of the stock is Rs.76.50. If the premium over conversion value is 21%, conversion rate per bond is [<Answer>](#)
 - (a) 3.00 shares
 - (b) 4.08 shares
 - (c) 5.50 shares

- (d) 6.07 shares
- (e) 7.12 shares.

8. Global chemicals Ltd., issued right shares that increased the market value of the shares of the company by Rs.180 crore. The existing base year average is Rs.750 crore. If the aggregate market value of all the shares included in the index before the right issue made is Rs.1200 crore, the new base year average is

- (a) Rs.669.81
- (b) Rs.782.30
- (c) Rs.862.50
- (d) Rs.911.17
- (e) Rs.978.22.

[<Answer>](#)

9. Which of the following statements is/are **false** with respect to yield curve?

- I. When the yields on short term issues are low and rise consistently with longer term to maturities and flatten out at the extremes is called declining yield curve.
- II. When yields on intermediate term issues are above those on short term issues and the rates on long term issues decline to levels below those for the short term and then level out is called humped yield curve.
- III. When the yields on short term issues are high and yields on subsequently longer maturities decline consistently is called rising yield curve.
- IV. A static function that depicts the relationship between the maturity and the yield-to-maturity of a bond is referred to as yield curve.

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

[<Answer>](#)

10. Which of the following statements is **true** under Preferred Habitat theory?

- (a) The theory assumes that the investors will act only on the basis of expected returns on bonds of different maturities
- (b) According to this theory it is not necessary that the liquidity premium should increase at a uniform rate with maturity
- (c) According to this theory, the investors are not indifferent to risk and they charge higher rate than the expected future rates, if the maturity of the instrument increases
- (d) This theory considers only the reinvestment risk
- (e) This theory is widely used to predict interest rates in different sectors of the economy.

[<Answer>](#)

11. The unsystematic risk of Prism Software in terms of percentage of total risk is 45. If the variance of its returns is $265(\%)^2$, coefficient of correlation of its returns with the market is

- (a) 0.56
- (b) 0.68
- (c) 0.74
- (d) 0.88
- (e) 0.93.

[<Answer>](#)

12. Moulin Synthetics Ltd. (MSL), has earning per share of Rs.21.50 in the previous year and paid out 35% of its earnings as dividend. Its earnings and dividend had grown at a rate of 8% p.a. and expected to grow at the same rate in future. If the required rate of return on the stock is 11.5%, the value of the stock of MSL is

- (a) Rs.232.20
- (b) Rs.310.21
- (c) Rs.445.15
- (d) Rs.215.00
- (e) Rs.226.08.

[<Answer>](#)

13. Which of the following statements is **false** under assumption made in technical analysis?

- (a) Supply and demand are governed only by rational factors
- (b) Some chart patterns tend to repeat themselves
- (c) Changes in trend are caused by shifts in supply and demand
- (d) Market value is determined solely by the interaction of supply and demand
- (e) Ignoring minor fluctuations in the market, stock prices tend to move in trends which persist for an appreciable period of time.

[<Answer>](#)

14. Which of the following statements is/are **false** in respect of modified duration?

- I. It can estimate percentage change in prices only for small yield changes.
- II. Calculation of modified duration is based on the assumption that cash flows from the bond are not affected by the changes in the yield.
- III. It is a representative measure when we consider bonds with embedded options.
- IV. Whenever the yield curve experiences a non-parallel shift, it is not easy to determine the interest rate sensitivity of a portfolio of bonds for changes in the interest rates.

[<Answer>](#)

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

15. Which of the following statements is **false** with respect to Price/Book value ratio (P/BV ratio)?

[<Answer>](#)

- (a) P/BV ratio of different firms can be compared to identify undervalued and overvalued stocks
- (b) A low P/BV ratio indicates that the firm has a price which is below the book value
- (c) This ratio does not serve as a reliable intuitive measure of value compared to the market price
- (d) It can be calculated for firms with negative earnings
- (e) When the required rate of return is high P/BV ratio goes down.

16. Which of the following statements is/are **false** under Chaos theory in technical analysis?

[<Answer>](#)

- I. The processes appear to be totally random and unpredictable.
- II. The processes are in fact predictable using non-linear prediction techniques.
- III. The accuracy of prediction drops rapidly as the prediction horizon is decreased.
- IV. The processes are highly sensitive to initial conditions.

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

17. Tulsi Herbals Ltd.(THL), is currently paying a dividend of Rs.12.50 per share. Mr. Ramesh Naidu, currently holding a stock of THL is having a required rate of return of 18%. If the dividends are expected to grow at a constant rate of 7.5%, duration of equity is

[<Answer>](#)

- (a) 5.78 years
- (b) 6.21 years
- (c) 7.13 years
- (d) 8.86 years
- (e) 10.24 years.

18. A 6-year bond is currently yielding 7.5% and a 5-year bond is yielding 7.2%. What is the implied yield for 1 year bond starting 5 years from now?

[<Answer>](#)

- (a) 6.51%
- (b) 7.27%
- (c) 9.01%
- (d) 11.74%
- (e) 13.11%.

19. Motilal Steels Ltd., has a net sales of Rs.750 lakh. The depreciation on the assets of the company is Rs.25 lakh. The cash earning per share of the company is Rs.26. If the net profit margin for the company is 14%, the earning per share is

[<Answer>](#)

- (a) Rs.18.50
- (b) Rs.21.00
- (c) Rs.33.45
- (d) Rs.42.67
- (e) Rs.51.11.

20. Which of the following statements is **false** with respect to the two-stage dividend discount model in equity valuation?

[<Answer>](#)

- (a) According to this model value of the stock is the addition of present value of dividends during supernormal growth rate and present value of terminal price
- (b) The model suffers with the limitation of the change of high supernormal growth to a lower stable growth rate at the end of the supernormal growth period
- (c) In this model, it is easy to specify the supernormal growth period with precision
- (d) The terminal price calculated in this model is derived from Gordon model
- (e) This model is best suited to those firms that register high growth rate and expects to maintain this growth rate for a certain period of time after the growth rate tends to decline.

21. Which of the following statements is **true** for Econometric Model Building Approach?

[<Answer>](#)

- (a) Econometric models can be meaningful for future projections if and only if the estimated co-efficient are found to be acceptable in respect of their stability over time
- (b) The major advantage of this approach is its versatility
- (c) It helps to measure how widespread a phenomenon is
- (d) As far as long term economic forecasting is concerned, an approach based on econometric methods has the advantage of providing a magnitude and direction to the dependent variable
- (e) Precise estimate of the dependent variable obtained from econometric model is always accurate.

22. Which of the following statements is **false** for Utility theory in risk return analysis?

[<Answer>](#)

- (a) Expected utility is an increasing function of expected return

- (b) Marginal utility is an increasing function of wealth
 (c) Investors' utility function evaluates the expected value and the standard deviation of returns, if the investors utility function is quadratic
 (d) Expected utility is a decreasing function of the standard deviation of return
 (e) Since outcomes of most investment are uncertain, investors are said to maximize their expected utility.
23. The implied price of a non-callable bond is Rs.121 and the observed price of a callable bond is Rs.126. The delta of the call option is 0.531. If the option-adjusted duration is 1.217, duration of the non-callable bond is [<Answer>](#)
- (a) 2.70 years
 (b) 2.18 years
 (c) 2.11 years
 (d) 2.36 years
 (e) 2.78 years.
24. Mr. Dilip Sinha had purchased two properties Trisha and Abhilasha. The net operating incomes from the properties are Rs.35,000 and Rs.48,000 respectively. If the market value of both the properties are Rs.7.6 lakh and Rs.8.9 lakh respectively, the average capitalization rate is [<Answer>](#)
- (a) 3.5%
 (b) 4.7%
 (c) 5.0%
 (d) 6.2%
 (e) 7.1%.
25. Mismatch FRNs is also called [<Answer>](#)
- (a) Capped FRNs
 (b) Flip-Flop FRNs
 (c) Rolling rate FRNs
 (d) Perpetual FRNs
 (e) Deleveraged FRNs.
26. Which of the following statements is **false**? [<Answer>](#)
- (a) The price of the bond decreases as the yield to maturity increases
 (b) A change in YTM affects the bonds with lower YTM more than it affects the bonds with higher YTM
 (c) The increase in the price of a bond associated with the changes in the interest rates will be at a diminishing rate as the term to maturity increases
 (d) For a given change in a bond's yield to maturity, the percentage price change will be higher for low coupon bonds than for high coupon bonds
 (e) For a difference between the coupon and the YTM, the extent of change in the price of the bond depends on the remaining term to the maturity.
27. A 12.5% coupon bond is issued at a face value of Rs.100 for 30 years. The coupon on bond is paid semi-annually and is callable in six years at a call price of Rs.120. If the bond is currently yielding 9%, yield to call of the bond is approximately [<Answer>](#)
- (a) 5.4%
 (b) 6.1%
 (c) 7.6%
 (d) 8.3%
 (e) 9.7%.
28. Which of the following statements is **false** for convexity of a bond? [<Answer>](#)
- (a) It is a measure of the curvature of the price-yield relationship and also indicates changes in duration
 (b) When coupon and maturity are constant the coupon of a bond and convexity are inversely related
 (c) When yield and coupon are constant the maturity of a bond and convexity are inversely related
 (d) When coupon and maturity are constant the yield of a bond and convexity are inversely related
 (e) Higher the duration of the bond higher the convexity.
29. Which of the following statements is/are **false** regarding the Key Rate Duration (KRD)? [<Answer>](#)
- I. KRD can identify the price sensitivity of an option embedded bond to each segment of the spot yield curve.
 II. KRD cannot capture the influence of multiple factors on the yield curve movement.
 III. Using KRD, a replicating portfolio of a bond with embedded options can be created using zero-coupon bonds.
 IV. The sum of KRDs should be equal to the modified duration.
- (a) Only (I) above
 (b) Only (III) above
 (c) Both (II) and (IV) above
 (d) (I), (III) and (IV) above
 (e) (II), (III) and (IV) above.
30. Which of the following statements is **false** with respect to triangles in technical analysis? [<Answer>](#)
- (a) It is commonly used to identify reversals and consolidations but are not very reliable information
 (b) A right angle triangle is formed when a series of rallies converge
 (c) A symmetrical triangle is formed when, in a series of rallies each succeeding one peaks at a lower level than the preceding peaks and the bottoms of the intervening relations are progressively low
 (d) Sometimes a right angle triangle develops into a rectangle
 (e) In a right angle triangle since the resistance or support level is implied in its formation, the direction of breakout can be identified even before the actual breakout.

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. The distribution of conditional returns and explicit probability distribution of stocks of Matrix Ltd. and Sunray Ltd. are as follows:

<Answer>

Probability	Conditional Returns	
	Matrix Ltd.	Sunray Ltd.
15%	28%	64%
30%	35%	38%
15%	23%	77%
25%	35%	44%
15%	18%	95%

You are **required** to

- Calculate the expected returns, standard deviations of returns for both the stocks and correlation co-efficient between the stocks. (5 marks)
- Determine the expected rate of return of a zero-risk portfolio consisting of the above stocks. (5 marks)

2. Mr. Suresh Agarwal is considering an investment of Rs.42 lakh in fixed income securities. The investment horizon is 6 years.

<Answer>

He is considering investment in one of the following:

- 13% non-convertible debentures of Mehta Fabrics Ltd. (MFL) (Face value Rs.1,000) selling at par. These debentures will be redeemed at par after 6 years. Interest is payable annually.
- 16% non-convertible debentures of Sayonara Paints Ltd. (SPL) (Face value Rs.1,000) selling at Rs.1,163. These debentures will be redeemed at par after 10 years. Interest is payable annually.

You are **required** to

- Find the interest rate risks of the two investments if the YTM increases by 1%. (7 marks)
- Advice Mr. Agarwal to immunize the investment against any immediate change in interest rates. Which one of the aforementioned instruments will you recommend him for this purpose? Give reasons. (2 marks)
- Discuss the conditions to be fulfilled for perfect immunization of bond investment. (3 marks)

3. On September 11, 2008 Mr. Mukesh Sinha bought two September futures contracts of crude oil at a price of Rs.6,090. On September 19, 2008 he squared-off his position at a price of Rs.6,460. On September 22, 2008 he took short position in two contracts at a price of Rs.6,100 and square-off his position on September 23, 2008 at a price of Rs.6,278. Each contract consists of 100 barrels. The initial and maintenance margin for each contract are Rs.40,000 and Rs.30,000 respectively. On September 10, 2008 Mr. Sinha had a balance of Rs.10,000 with the broker.

<Answer>

The closing price per barrel of crude oil with respective trading days are as follows:

Trading Days	Closing Prices (Rs.)
September 12, 2008	6,112
September 15, 2008	5,900
September 16, 2008	6,365
September 17, 2008	6,670
September 18, 2008	6,278
September 19, 2008	6,460
September 22, 2008	6,119

You are **required** to calculate:

- Daily gain and loss along with cumulative trading profits and losses. (5 marks)
- Equity and margin account. (Assume no amount was withdrawn from the margin accounts). (6 marks)

[<Answer>](#)

4. The stock of Maxim Computers Ltd.(MCL) exhibits the following regression line:

$$r_{it}(\%) = \alpha_i + \beta_{i_{\text{mnt}}} + e_{it}$$

The regression line explains only 75% of the variation in the return on MCL stock. The variance in market return is 135(%)². The covariance of stock return with that of market is 180 (%)².

You are **required** to find

- Systematic and unsystematic risk for MCL stock.
- Whether the stock of MCL is defensive or aggressive?

(5 marks)

(2 marks)

[<Answer>](#)

5. During the year 2007-08, four companies Mudra Textiles Ltd., Forgings Steel Ltd, Minerva Pharmaceuticals Ltd. and Speed Auto Ltd. have declared dividend on December 28, 2007. Mr. Manohar Pai working in a research firm wanted to test whether the Indian markets are exhibiting semi-strong form of efficiency or not. He estimated the characteristic lines to study the relationship between the returns on these three companies and the return on the market index for a period of five years on a monthly basis up to September 28, 2007, which are as follows:

$$r_{\text{MUDRA},t} = 1.78\% + 0.82r_{m,t}$$

$$r_{\text{FORGINGS},t} = 1.55\% + 1.19r_{m,t}$$

$$r_{\text{MINERVA},t} = 1.45\% + 1.62r_{m,t}$$

$$r_{\text{SPEED},t} = 1.29\% + 1.20r_{m,t}$$

The following table shows the returns on the stocks of the four companies and the market return for the period three months before and three months after the declaration of dividend:

Period (months)	Actual Return (%)				Market return($r_{m,t}$) (%)
	$r_{\text{MUDRA},t}$	$r_{\text{FORGINGS},t}$	$r_{\text{MINERVA},t}$	$r_{\text{SPEED},t}$	
September 28, 2007	12.83	18.12	11.39	12.45	16.46
October 28, 2007	10.92	12.13	12.49	9.63	14.07
November 28, 2007	31.81	16.86	9.30	14.21	15.67
December 28, 2007	18.32	15.25	10.93	11.83	10.66
January 28, 2008	19.53	14.27	11.38	17.56	12.21
February 28, 2008	10.52	15.38	18.49	12.00	18.18
March 28, 2008	13.86	14.44	10.45	16.73	11.04

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

(10 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 concept of an industry life cycle includes various stages that can be applied to industries or product line within industries to complete the life cycle processes. Describe briefly the various stages of industry life cycle.

(10 marks) [<Answer>](#)

7. There are various characteristics that make the valuation of real estate portfolio different from that of bonds or stocks. Explain those characteristics in detail.

(10 marks) [<Answer>](#)

END OF SECTION C

END OF QUESTION PAPER

Suggested Answers

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Section A: Basic Concepts

Answer	Reason	
1.	e Junk bonds are high yield bonds issued by companies and are considered highly speculative because of high risk of default. Hence option (e) is the answer.	< TOP >
2.	a According to EMH, successive absolute short run price changes are independent. Other statements are true. Hence option (a) is the answer.	< TOP >
3.	b Let the required rate of return be x $81.62 = \frac{12}{x} + \frac{104}{1+x}$ At x = 18% $12 \times 3.1272 + 104 \times 0.4371$ $= 82.98$ At x = 19% $12 \times 3.0576 + 104 \times 0.4190$ $= 80.27$ X = 18.5%	< TOP >
4.	E Let r be the required rate of return MV = or, 6048148 = r = 16.07%	< TOP >
5.	c Islands refer to the formation of an isolated price pattern, usually within a narrow range, at the end of a price trend. Hence option (c) is the answer.	< TOP >
6.	d An economy of scale is major source of barriers to entry. Hence option (d) is the answer.	< TOP >
7.	a Let x be the conversion value Premium over conversion value = 0.21 or, 1.21x = 278 or, x = Rs. 229.75 Market price per share is Rs.76.5 Let a be the conversion rate Conversion value = market price per share x conversion rate $= 76.5 \times a = 229.75$ a = 3 shares Conversion rate is 3 shares per bond	< TOP >
8.	c $\text{New Base year Average} = \frac{\text{Old Base Year Average}}{\text{Index}}$ $= \frac{862.50}{1.025}$ Thus, new Base Year Average is Rs. 862.50 crore.	< TOP >
9.	d A rising yield curve is formed when the yields on short term issues are low and rise consistently with longer term to maturities and flatten out at the extremes. A declining yield curve is formed when the yields on short term issues are high and yields on subsequently longer maturities decline consistently. Hence statement (I) and (III) are false. Other statement is true. Thus option (d) is the answer	< TOP >
10.	b According to this theory it is not necessary that the liquidity premium should increase at a uniform rate with maturity. Other options are false. Hence option (b) is the answer.	< TOP >
11.	c Unsystematic risk (as a % of total risks) = $100(1 - \rho^2)$ = 45 Where ρ is the co-efficient of correlation between returns on the security and market. $1 - \rho^2 = 0.45$ $\rho^2 = 1 - 0.45$ $\rho = 0.74$	< TOP >
12.	a EPS = Rs. 21.50 DPS = 0.35×21.50 = Rs. 7.525 Growth rate = 8% Value of the stock = $\frac{DPS}{r - g}$ = Rs. 232.20	< TOP >
13.	a Supply and demand are governed by numerous factors, both rational and irrational. Therefore, option (a) is the answer.	< TOP >

14. b Calculation of modified duration is based on the assumption that cash flows from the bond are not affected by the changes in the yield. Hence it will not be a representative measure when we consider bonds with embedded options. Thus statement (III) is false. Other statements are true. Hence option (b) is the answer. [< TOP >](#)
15. c This ratio serve as a reliable intuitive measure of value compared to the market price. Hence option (c) is false. Other options are true. Thus option (c) is the answer. [< TOP >](#)
16. a The accuracy of prediction drops rapidly as the prediction horizon is increased. Hence statement (III) is false. Other statements are true. Thus option (a) is the answer. [< TOP >](#)
17. E Duration = [< TOP >](#)
 Where
 Dividend yield =
 Current market price = * = = Rs 127.98
 $\therefore$ Dividend yield = = 0.09767
 $\therefore$ Duration = = 10.24 years
18. c Let f_6 be the implied yield for 1 year bond starting 5 years from now [< TOP >](#)
 $1+f_6 = = = 1.0901$
 $1+f_6 = 1.0901$
 $f_6 = 9.01\%$
19. b Let PAT be x [< TOP >](#)
 Net profit margin = PAT/Sales
 $0.14 = x/750$
 $x = 105$ lakh
 Cash earning per share =
 $26 =$
 Number of shares = 5 lakh
 Earning per share = $105/5 = \text{Rs.}21$
20. c In this model it is difficult to specify the supernormal growth period with precision. Hence option (c) is false. Others statements are true. [< TOP >](#)
21. a Econometric models can be meaningful for future projections if and only if the estimated co-efficient are found to be acceptable in respect of their stability over time. Other statements are false. Hence option (a) is the answer. [< TOP >](#)
22. b Marginal utility is a decreasing function of wealth. Other statements are true. Hence option (b) is the answer. [< TOP >](#)
23. a Let the duration of non convertible bond be x [< TOP >](#)
 Option adjusted duration
 $X = 2.70$ years
24. c [< TOP >](#)
- | Property | NOI (Rs.) | Market value (Rs.) | Capitalization rate (%) (NOI/Market value) |
|-----------|-----------|--------------------|--|
| Trisha | 35000 | 760000 | 4.61 |
| Abhilasha | 48000 | 890000 | 5.39 |
- Average capitalization rate = $(4.61 + 5.39)/2 = 5\%$
25. c Mismatch FRNs is also called Rolling rate FRNs. [< TOP >](#)
26. b A change in YTM affects the bonds with a higher YTM more than it affects the bonds with lower YTM. Other statements are true. Hence option (b) is the answer. [< TOP >](#)
27. c Current price of the bond = $6.25 \times \text{PVIFA}_{(4.5\%, 60)} + 100 \times \text{PVIF}_{(4.5\%, 60)}$ [< TOP >](#)
 $= \text{Rs.}136.12$
 Time to call = 6 years or 12 semi-annual periods
 Price at which it is called is Rs.120
 $\therefore 136.12 = 6.25 \times \text{PVIFA}_{(r\%, 12)} + 120 \times \text{PVIF}_{(r\%, 12)}$
 $r = 3.8\%$ or 7.6% annually.
28. c When yield and coupon are constant the maturity of a bond and convexity are directly related. Hence option (c) is false. Other statements are true. [< TOP >](#)
29. c KRD can capture the influence of multiple factors on the yield curve movement. The sum of KRDs should be [< TOP >](#)

equal to the effective rate of duration. Other statements are true. Hence option (c) is the answer.

30. c A symmetrical triangle is formed when, in a series of rallies each succeeding one peaks at a lower level than the preceding peaks, and the bottoms of the intervening relations are progressively high. Other statements are true. Hence option (c) is the answer.

[< TOP >](#)

Section B: Problems

1. a. **Matrix Stock**

[< TOP >](#)

$R_{(S)}$	P_i	$P_i R_S$	$(R_S - E_{(S)})$	$P_i [(R_S - E_{(S)})]^2$
28%	0.15	4.20	-1.60	0.38
35%	0.30	10.50	5.40	8.75
23%	0.15	3.45	-6.60	6.53
35%	0.25	8.75	5.40	7.29
18%	0.15	2.70	-11.60	20.18

$$E_{(S)} = \sum P_i R_S = 29.60\%$$

$$\sum P_i [(R_S - E_{(S)})]^2 = 43.13(\%)^2$$

$$\sigma_S = \sqrt{43.13} = 6.57\%.$$

Sunray Stock

$R_{(E)}$	P_i	$P_i R_E$	$(R_E - E_{(E)})$	$P_i (R_E - E_{(E)})^2$
64%	0.15	9.60	6.20	5.766
38%	0.30	11.40	-19.80	117.612
77%	0.15	11.55	19.20	55.296
44%	0.25	11.00	-13.80	47.61
95%	0.15	14.25	37.20	207.58

$$E_{(E)} = \sum P_i R_E = 57.80\%$$

$$\sum P_i [(R_E - E_{(E)})]^2 = 433.86(\%)^2$$

$$\sigma_E = \sqrt{433.86} = 20.83\%$$

Covariance between two stocks

P_i	$(R_S - E_S)$	$(R_E - E_E)$	$P_i (R_S - E_S) \times (R_E - E_E)$
0.15	-1.60	6.20	-1.488
0.30	5.40	-19.80	-32.076
0.15	-6.60	19.20	-19.008
0.25	5.40	-13.80	-18.63
0.15	-11.60	37.20	-64.728

$$\sum P_i (R_S - E_S) \times (R_E - E_E)$$

$$\text{COV}_{(S \& E)} = -135.93(\%)^2$$

$$\text{Correlation coefficient} = \frac{-135.93}{6.57 \times 20.83} = -1$$

Since the correlation between two stocks is -1 . A zero risk portfolio can be constructed using these stocks.

If W_1 and W_2 is proportion of investment in Spark and Electra stocks. The portfolio risk will be

$$\begin{aligned} \text{b. } \sigma_p &= \sqrt{W_1^2 \sigma_1^2 + W_2^2 \sigma_2^2 + 2W_1 W_2 \text{COV}_{(S \& E)}} \\ &= \sqrt{W_1^2 \sigma_1^2 + W_2^2 \sigma_2^2 + 2W_1 W_2 (-135.93)} \\ &= \sqrt{W_1^2 \sigma_1^2 + W_2^2 \sigma_2^2 - 271.86 W_1 W_2} \end{aligned}$$

$$0 = W_1 \sigma_1 - W_2 \sigma_2$$

$$W_1 \sigma_1 = W_2 \sigma_2 \quad (i)$$

$$\text{Again } W_1 + W_2 = 1$$

$$\text{or } W_2 = 1 - W_1 \quad (ii)$$

Putting the value of W_2 in equation (i)

$$W_1 \sigma_1 = (1 - W_1) \sigma_2$$

$$W_1 \sigma_S = (1 - W_1) \sigma_E$$

$$6.57 W_1 = (1 - W_1) 20.83$$

$$(6.57 + 20.83) W_1 = 20.83$$

$$W_1 = \frac{20.83}{27.4} = 76.02\%$$

$$W_2 = 1 - 0.7602 = 0.2398 = 23.98\%$$

Expected return of risk free portfolio

$$= 0.7602 \times 29.6 + 0.2398 \times 57.8$$

$$= 36.36\%.$$

2. a. To compute the interest rate risk, it is essential to calculate the YTM, duration

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I. YTM of the two bonds:

A. Bond of Mehta Fabrics Ltd. (MFL)

Selling at par is redeemable at par

$$\therefore K_d = 0.13$$

B. Bond of Sayanora Paints Ltd. (SPL)

$$1163 = 160 \times PVIFA_{(k\%, 10 \text{ years})} + 1000 \times PVIF_{(k\%, 10)}$$

$$k = 13\%$$

II. Durations of the two bonds:

$$D = \frac{C}{r_c} \times PVIFA(r_d, n) \times (1 + r_d) + \frac{F}{F - C} \times n$$

Where, r_c = Current yield

r_d = YTM

n = Period to maturity in years.

$$D_{MFL} = \frac{1.13}{0.13} \times PVIFA_{(13\%, 6)} \times 1.13 + \frac{1000}{1000 - 1.13} \times 6$$

$$= 3.9975 \times 1.13 = 4.52 \text{ years}$$

$$D_{SPL} = \frac{1.13}{0.13} \times PVIFA_{(13\%, 10)} \times 1.13 + \frac{1000}{1000 - 1.13} \times 10$$

$$= 6.49 - 0.58$$

$$= 5.91 \text{ years or 6 years}$$

III. Interest rate risk of the two bonds

$$= -D \times$$

For bond of Mehta Fabrics Ltd.

$$\Delta P = -4.52 \times 1\% = -0.04 \text{ i.e. 4\% decrease in bond price for increase in YTM by 1\%}.$$

For bond of Sayanora Paints Ltd.

$$\Delta P = -6 \times 1\% = -0.05 \text{ i.e. 5\% decrease in bond price for increase in YTM by 1\%}.$$

b. To achieve immunization which implies eliminating the interest rate risk, the duration of the asset must be set equal to the holding period of the investor. In this case holding period of the investor is 6 years hence bond's of Sayonara Paints Ltd. which is having duration of 6 years is recommended.

c. The investment will have perfect immunization only if the following assumptions hold good:

- The investment is made in a default free bond or portfolio of bonds.
- The buy and hold strategy is adopted by the investor
- There is only a time change in interest rate during the investment horizon.
- The term structure is flat.
- The duration of a bond or a portfolio of bonds is matched with investment horizon.

3. a.

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Trading Days	Trade Price (Rs./barrel)	Closing prices (Rs./barrel)	Marked to market (in Rs.)	Cumulative
September 12, 2008	6090	6112	4400	4400
September 15, 2008		5900	-42400	-38000
September 16, 2008		6365	93000	55000
September 17, 2008		6670	61000	116000
September 18, 2008		6278	-78400	37600
September 19, 2008	6460	6460	36400	74000
September 22, 2008	6100	6119	-3800	70200
September 23, 2008	6278	6278	-31800	38400

b.

Equity and Margin account

Trading Days	Transaction	Equity			Margin account		
		Beginning	Cash flows	Ending	Margin Call	Deficiency	Excess
September 11, 2008	Buys two contracts	10000		10000			
September 12, 2008	Deposits Rs. 70000	80000	4400	84400			4400
September 15, 2008		84400	-42400	42000	38000	38000	
September 16, 2008	Deposits Rs. 38000	80000	93000	173000			93000
September 17, 2008		173000	61000	234000			154000
September 18, 2008		234000	-78400	155600			75600
September 19, 2008	Sells two contracts	155600	36400	192000			112000
September 22, 2008		192000	-3800	188200			108200

September 23, 2008	Bought two contracts	188200	-31800	156400			76400
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4. a. $\text{Cov}_{(i, m)} =$

$\Rightarrow 180 =$

$\Rightarrow \sigma_i = 17.89\%$

Systematic risk of MCL stock $= 0.75 \times (17.89)^2 = 240.04(\%)^2$

Unsystematic risk of MCL Stock $= 0.25 \times (17.89)^2 = 80.01(\%)^2$

b. Beta of MCL stock, $= 1.33$

As beta of MCL stock is more than 1 it is an aggressive stock.

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$r_{\text{MUDRA},t} = 1.78\% + 0.82r_{m,t}$				
	Actual Return	Market Return	Expected Return	Abnormal Return
28-Sep-07	12.83	16.46	15.28	-2.45
28-Oct-07	10.92	14.07	13.32	-2.40
28-Nov-07	31.81	15.67	14.63	17.18
28-Dec-07	18.32	10.66	10.52	7.8
28-Jan-08	19.53	12.21	11.79	7.74
28-Feb-08	10.52	18.18	16.69	-6.17
28-Mar-08	13.86	11.04	10.83	3.03

$r_{\text{FORGINGS},t} = 1.55\% + 1.19r_{m,t}$				
	Actual Return	Market Return	Expected Return	Abnormal Return
28-Sep-07	18.12	16.46	21.14	-3.02
28-Oct-07	12.13	14.07	18.29	-6.16
28-Nov-07	16.86	15.67	20.20	-3.34
28-Dec-07	15.25	10.66	14.24	1.01
28-Jan-08	14.27	12.21	16.08	-1.81
28-Feb-08	15.38	18.18	23.18	-7.80
28-Mar-08	14.44	11.04	14.69	-0.25

$r_{\text{MINERVA},t} = 1.45\% + 1.62r_{m,t}$				
	Actual Return	Market Return	Expected Return	Abnormal Return
28-Sep-07				

	11.39	16.46	28.12	-16.73
28-Oct-07	12.49	14.07	24.24	-11.75
28-Nov-07	9.30	15.67	26.84	-17.54
28-Dec-07	10.93	10.66	18.72	-7.79
28-Jan-08	11.38	12.21	21.23	-9.85
28-Feb-08	18.49	18.18	30.90	-12.41
28-Mar-08	10.45	11.04	19.33	-8.88

$r_{\text{SPEED},t} = 1.29\% + 1.20r_{m,t}$				
	Actual Return	Market Return	Expected Return	Abnormal Return
28-Sep-07	12.45	16.46	21.04	-8.59
28-Oct-07	9.63	14.07	18.17	-8.54
28-Nov-07	14.21	15.67	20.09	-5.88
28-Dec-07	11.83	10.66	14.08	-2.25
28-Jan-08	17.56	12.21	15.94	1.62
28-Feb-08	12.00	18.18	23.11	-11.11
28-Mar-08	16.73	11.04	14.54	-2.19

Average abnormal return to each of the months before and after the dividend was announced are:

Third month before the announcement of dividend
 $= -7.70\%$

Second month before the announcement of dividend
 $= -7.21\%$

First month before the announcement of dividend
 $= -2.40\%$

Month during which the dividend was announced
 $= -0.31\%$

First month after the announcement of dividend
 $= -0.58\%$

Second month after the announcement of dividend
 $= -9.37\%$

Third month after the announcement of dividend
 $= -2.07\%$

Cumulative Average Abnormal returns (CAAR) for the period of three months before and after the announcement of dividend is

$CAAR = (-7.70 - 7.21 - 2.40 - 0.31 - 0.58 - 9.37 - 2.07) = -29.64\%$.

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

Section C: Applied Theory

6. Many observers believe that industries evolve through four stages – the pioneering stage, the expansion stage, the stabilization stage and the declining stage.

Pioneering Stage

In this stage, rapid growth in demand occurs. Although a number of companies within a growing industry will fail at this stage because they will not survive the competitive pressures, most experience rapid growth in sales and earnings, possibly at an increasing rate. The opportunities available may attract a number of companies, as well as venture capital. Considerable jockeying for position occurs as the companies battle each other for survival, with the weaker firms failing and dropping out. Investor risk in an unproven company is high, but so are expected returns if the company succeeds. At the pioneering stage of an industry it can be difficult for security analysts to identify the likely survivors, just when the ability to identify the future strong performers is most valuable. By the time it becomes apparent who the real winners are, their prices may have been bid up considerably beyond what they were in the earlier stages of development.

Expansion Stage

In this second stage of an industry's life cycle the survivors from the pioneering stage are identifiable. They continue to grow and prosper, but the rate of growth is more moderate than before. At the expansion stage of the cycle, industries are improving their product and perhaps lowering their prices. They are more stable and solid, and at this stage they often attract considerable investment funds. Investors are more willing to invest in these industries now that their potential has been demonstrated and the risk of failure has decreased.

"Financial policies become firmly established at this stage. The capital base is widened and strengthened dividends often become payable, further enhancing the attractiveness of these companies to a number of investors.

Stabilization Stage

Finally, industries evolve into the stabilization stage (sometimes referred to as the maturity stage), at which the growth begins to moderate. Sales may still be increasing, but at a much slower rate than before. Products become more standardized and less innovative, the market place is full of competitors, and costs are stable rather than decreasing through efficiency moves and so on. Industries at this stage continue to move along, but without significant growth.

Stagnation may occur for considerable periods of time, or intermittently.

This three-part classification of industry evolution is helpful to investors in assessing the growth potential of different companies in an industry. Based on the stage of the industry, they can better assess the potential of companies within that industry. However, there are limitations to this type of analysis. First, it is only a generalization, and investors must be careful not to attempt to categorize every industry, or all companies within a particular industry, into neat categories that may not apply. Second, even the general framework may not apply to some industries that are not categorized by many small companies struggling for survival. Finally, the bottom line in security analysis is stock prices, a function of the expected stream of the benefits and risk involved. The industrial life cycle tends to focus on sales and share of the market and investment in the industry. Although all of these factors are important to investor, they are not the final items of interest. Given these qualifications to industry life cycle analysis, what are the implications to investors?

The 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. Such risk may be appropriate for some investors, but many will wish to avoid the risk inherent in this stage.

The maturity stage is to be avoided by investors interested primarily in capital gains. Companies at this stage may have relatively high dividend pay-outs because their growth prospects are fewer. These companies often offer stability in earnings and dividend growth.

Declining Stage

In this stage of the industrial life cycle – decline is indicated on either a relative or absolute basis. Clearly, investors should seek to spot industries in this stage and avoid them.

It is the second stage i.e. expansion, that is probably of most interest to investors. Industries that have survived the pioneering stage often offer good opportunities as the demand for their products and services is growing more rapidly than the economy as a whole. Growth is rapid, but orderly, an appealing characteristic to investors.

7. **Characteristics of Real Estate/Property Markets**

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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