

# Question Paper

## Security Analysis - I (MSF2D1) : January 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. Which of the following statement(s) is/are **false** for Price to Book Value (P/BV) ratio? [<Answer>](#)
  - I. P/BV ratio can be calculated even for firms with negative earnings.
  - II. If a firm has continuous negative earnings, then the book value of equity can become negative leading to a negative P/BV ratio.
  - III. When the required rate of return is high the P/BV ratio goes up.
  - (a) Only (I) above
  - (b) Only (III) above
  - (c) Both (I) and (II) above
  - (d) Both (I) and (III) above
  - (e) All (I), (II) and (III) above.
  
2. If a vertical rally or a decline is interrupted by a consolidation pattern akin to a rectangle, such a formation is called [<Answer>](#)
  - (a) Saucers and Rounding Tops
  - (b) Double Tops and Bottoms
  - (c) Head and Shoulders
  - (d) Gaps
  - (e) Flags.
  
3. Martin Electronics Ltd. is engaged in manufacturing electronic gadgets. The company's free cash flow to equity per share in first, second and third year are estimated at Rs. 8.31, Rs. 9.15 and Rs. 10.06 respectively. Its equity beta is 1.5. T-Bills are trading in the market at 6% p.a. The market risk premium is 5.5%. The supernormal growth rate in free cash flows is estimated at 10% p.a in the next three years. After that, the growth rate is expected to stabilize 4.5% p.a. forever. The present value of each share is [<Answer>](#)
  - (a) Rs. 93.33
  - (b) Rs. 113.42
  - (c) Rs. 121.78
  - (d) Rs. 134.15
  - (e) Rs. 145.66.
  
4. The market rate of interest on 2 years bond is 8.63% while the rate on one year bond is 8.21%. The forward rate on a one year bond, one year from now is 8.45%. Assuming pure expectations theory holds good, the liquidity premium to induce investors to hold the 2 year bond is [<Answer>](#)
  - (a) 0.30%
  - (b) 0.46%
  - (c) 0.52%
  - (d) 0.61%
  - (e) 0.74%.
  
5. Which of the following is also called rolling rate FRNs? [<Answer>](#)
  - (a) Mismatch FRNs
  - (b) Flip-Flop FRNs
  - (c) Capped FRNs
  - (d) Perpetual FRNs
  - (e) Structured FRNs.
  
6. Kootchar Ltd. has a project of constructing a Multiplex in Mumbai. The project is financed by 35% equity and the remaining from issuance of bonds bearing a coupon rate of 7.5% p.a. maturing in 7 years. The required rate of return, of equity holders is 20%. If a sinking fund is established to redeem the bonds, the capitalization rate is [<Answer>](#)

- (a) 12.51%
- (b) 13.49%
- (c) 14.26%
- (d) 15.78%
- (e) 19.27%.

7. Which of the following statements is/are **false** for convexity of a bond?

[<Answer>](#)

- I. When coupon and maturity are constant, the coupon of a bond and convexity are inversely related.
- II. When coupon and maturity are constant, the yield of a bond and convexity are inversely related.
- III. When yield and coupon are constant, the maturity of a bond and convexity are inversely related.

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

8. Which of the following statements is **false** for forward contracts?

[<Answer>](#)

- (a) Terms are structured to suit both the contracting parties
- (b) Traders have no compulsion to deposit initial margin irrespective of their trading positions
- (c) No organization guarantees the performance of the counterparty
- (d) Trades have to pay daily settlement margin depending on the movement in the price of the underlying stock
- (e) It is an over-the-counter product.

9. Consider the following information:

[<Answer>](#)

| Stock | Return (%) | Variance (%) <sup>2</sup> | Weight in the portfolio |
|-------|------------|---------------------------|-------------------------|
| Alpha | 12         | 361                       | 0.55                    |
| Beta  | 10         | 225                       | 0.45                    |

If the variance of the returns of portfolio is 180 (%)<sup>2</sup>, the coefficient of correlation between the stocks return is

- (a) -0.1642
- (b) +0.1788
- (c) +0.2145
- (d) +0.2314
- (e) -0.2527.

10. The cash earning per share of Mihir Industries Ltd. is Rs.15 and sales of the company is Rs.540 lakhs. The depreciation provided by the company is Rs. 50 lakhs. If the company has 15 lakhs shares outstanding, the net profit margin of the company is

[<Answer>](#)

- (a) 18.75%
- (b) 27.12%
- (c) 32.41%
- (d) 41.77%
- (e) 50.07%.

11. Which of the following interest rate theory states that, investors are not indifferent to risk and they charge higher rates than the expected future rates, if the maturity of the instrument increases?

[<Answer>](#)

- (a) Preferred habitat theory
- (b) Liquidity premium theory
- (c) Segmentation theory
- (d) Liquidity preference theory
- (e) Pure expectations theory.

12. Cox, Ingersoll and Ross model of term structure accommodates stochastic production possibilities and uncertain technological changes. Which of the following statement is **false** for Cox, Ingersoll and Ross model (CIR)?

[<Answer>](#)

- (a) This model can be implemented by regressing cross-sections of bond returns on their durations
- (b) It is consistent with the valuation of fixed income securities

- (c) Because of continuously defined maturities in the model, exposure can be calculated for zero-coupon bonds of any maturity with recourse to approximation or interpolation
- (d) Mean and variance of the factors return can be estimated directly by observing the time series of factors returns
- (e) It allows only one type of yield curve shift and hence has limited application.

13. Maxwell Inc. recently issued 15-year bonds. The bonds have a coupon rate of 7.5 percent and pays interest semi-annually. The bonds are callable in 5 years at a call price equal to 13 percent premium to par value. The par value of the bonds is Rs. 1,000. If the yield to maturity is 6 percent, yield to call is

[<Answer>](#)

- (a) 3.45%
- (b) 4.21%
- (c) 5.07%
- (d) 6.28%
- (e) 7.34%.

14. Unit evaluation is one of the key parameter while rating debt instruments. Which of the following is considered for the assessment of unit evaluation?

[<Answer>](#)

- (a) Group or associate company performances, support and synergy
- (b) Need and plan for modernization and debottlenecking
- (c) In-house expertise and expertise for absorption for technology
- (d) Management information and monitoring system
- (e) Efforts for skill development and productivity improvement.

15. Given total debt-equity ratio = 2:3; total assets = Rs.5,600; short-term debt = Rs.450 and total debt consists only of long-term debt and short-term debt, the long-term debt is equal to

[<Answer>](#)

- (a) Rs. 1,250
- (b) Rs. 1,790
- (c) Rs. 1,840
- (d) Rs. 1,960
- (e) Rs. 2,120.

16. Which of the following statements are **true** with respect to Option-Adjusted-Spread (OAS)?

[<Answer>](#)

- I. It is a measure of the yield spread, which can be used to convert differences between the values and the prices.
  - II. It is basically used as a tool to reconcile value with market price.
  - III. The higher the expected interest rate volatility, the higher the OAS.
  - IV. The cash flows of the callable bond are adjusted to reflect the embedded option; the resulting spread is called option adjusted spread.
- (a) Both (I) and (IV) above
  - (b) Both (II) and (III) above
  - (c) (I), (II) and (IV) above
  - (d) (I), (III) and (IV) above
  - (e) (II), (III) and (IV) above.

17. The required rate of return of a company is 18%. It has paid a dividend of Rs.3.50 for the last year, if the stock is currently trading at its intrinsic value of Rs.65.50, the growth rate in dividend is

[<Answer>](#)

- (a) 11.32%
- (b) 12.01%
- (c) 13.61%
- (d) 14.55%
- (e) 15.79%.

18. Following data pertaining to Morison Ltd. are given below :

[<Answer>](#)

| Day | Closing price (Rs.) | 100 EMA for previous day (Rs.) |
|-----|---------------------|--------------------------------|
| 1   | 75.00               | 71.00                          |
| 2   | 78.00               | 72.50                          |
| 3   | 84.00               | 73.00                          |

The 100 day EMA for day 3 is

- (a) Rs. 52.58
- (b) Rs. 67.89
- (c) Rs. 73.22
- (d) Rs. 81.05
- (e) Rs. 96.41.

19. Which of the following statements is/are **false** with respect to PEG ratio?

[<Answer>](#)

- I. If the PEG ratio is less than one, it is a sign of possibly undervalued stock or the market does not expect the company to achieve the earnings growth that is reflected in the market estimates.
- II. Value stock usually has a PEG ratio more than one.
- III. PEG ratio is particularly helpful in valuing small and mid-cap growth stocks, which typically pay no dividend.

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

20. Which of the following principles is **true** while analyzing trendline penetrations?

[<Answer>](#)

- (a) The lesser the number of peaks/troughs that touch a trendline, the greater is its significance
- (b) The breadth of a trendline indicates whether a penetration is significant or not
- (c) A steep trendline is easily violated by small sideward movements in the price chart, and is not particularly useful in identifying reversals
- (d) Penetration of a steep trendline results in a corrective movement after which the new trend starts
- (e) When the peaks of rallies reach the trend line and then return with penetration, the recurrence of this tendency indicates that the trend “obeys” the trendline.

21. Which of the following statements is/are **true** of “market extraction method” to derive the capitalization rate of real assets?

[<Answer>](#)

- I. In this method, net operating income is divided by sales price to get the capitalization rate.
- II. In this method, the rates on equity as well as debt financing rates are weighted according to their proportions to calculate the capitalization rate.
- III. In this method, the capitalization rate is the sum of the return required on an asset for its being non-liquid, and the risk free rate.
- IV. In this method, comparable property is selected to choose a rate which reflects market sentiments.

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

22. Which of the following statements is/are **not correct** with respect to 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 can capture the influence of multiple market factors on the yield curve movement.
- III. The major drawback of KRD is that it is calculated based on the assumption of parallel shifts in the yield curve.
- IV. The sum of KRDs will be equal to the effective duration.

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

23. If stock is purchased at Rs.45.50 and a Rs.50 call is written for a premium of Rs.2, the maximum possible gain per share is

[<Answer>](#)

- (a) Rs.3.00
- (b) Rs.4.25

- (c) Rs.5.58
- (d) Rs.6.50
- (e) Rs.7.80.

24. Which of the following is/are the applications of ex-ante SML?

[<Answer>](#)

- I. Test of asset pricing theories.
- II. Test of market efficiency.
- III. Evaluating the performance of a portfolio manager.
- IV. Identifying undervalued securities.

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

25. Which of the following statements is **false** with respect to Head and Shoulders price pattern?

[<Answer>](#)

- (a) Volume is low at the left shoulder and continues to rise, albeit at a lower rate at the head
- (b) The left shoulder signifies the penultimate rally in the bull market
- (c) Neckline is a line that joins the points from where the final rally begins and ends
- (d) The right shoulder confirms the beginning of a bear market
- (e) Head and shoulders pattern occurring at market bottoms is called inverted head and shoulder.

26. The duration for a bond paying semi-annual coupon is 6.72 years for a maturity of 10 years. If the YTM of the bond is 12.5% with a coupon rate of 11% and face value is Rs.100, the modified duration of the bond is

[<Answer>](#)

- (a) 4.78 years
- (b) 5.21 years
- (c) 6.32 years
- (d) 7.14 years
- (e) 8.22 years.

27. Which of the following statements is **true**?

[<Answer>](#)

- (a) If market price = face value, then coupon rate > YTM > current yield
- (b) If market price = face value, then coupon rate < current yield < YTM
- (c) If market price < face value, then coupon rate > current yield > YTM
- (d) If market price < face value, then coupon rate = current yield = YTM
- (e) If market price > face value, then coupon rate > current yield > YTM.

28. Which of the following statements is **false** for odd-lot theory?

[<Answer>](#)

- (a) Small investors who often buy or sell odd lots are usually wrong in their action at market peaks and troughs
- (b) It is the ratio of odd lot sales to odd lot purchase
- (c) A decline in this index would indicate less purchases in relation to sales by small investors, suggesting they are optimistic
- (d) A variation of the odd lot index is the odd-lot short sales ratio
- (e) Odd lotters are expected to sell short at precisely the wrong time, i.e. prior to a rise in prices.

29. Mr. Laxman Iyer an employee of Taurus Ltd. was not able to earn profit from the information he had about the likely profit figure for the company, even after trying for an extended period of time. This means that the market is exhibiting

[<Answer>](#)

- (a) Weak form of market efficiency
- (b) Semistrong form of market efficiency
- (c) Super strong form of market efficiency
- (d) Near strong form of market efficiency
- (e) Inefficiency.

30. Mr. Muktar Singh purchased an annual interest coupon bond one year ago that had 6 years remaining to maturity at that time. The coupon interest rate was 11.5% and the par value was Rs.1,000. At the time he purchased the bond, the yield to maturity was 9.5%. If he sells the bond today after receiving the first interest payment and when the yield to maturity is 7%, his annual total rate of return on holding the bond for the year would be

[<Answer>](#)

- (a) 12.78%

- (b) 14.94%  
 (c) 16.52%  
 (d) 19.40%  
 (e) 21.55%.

**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. Global Technologies Ltd. designs, manufactures and markets all the necessary equipment for mid range and super specialty hospitals. The company had reported earnings per share of Rs.2.25 in the current year, and paid no dividends during the year. It had revenues of Rs.11.84 per share, capital expenditures of Re.0.57 per share and depreciation of Re.0.24 per share in the current year respectively. Earnings and revenues are expected to grow 18% a year during the next five years. The growth rate is expected to decline linearly over the subsequent five years, and then stabilize at a rate of 8%. During the high growth and transition periods, capital spending and depreciation are expected to grow at the same rate as earnings, but are expected to offset each other when the firm reaches steady state. The net working capital is expected to be 70% of revenues. The current debt ratio for the company is 12% and is expected to remain the same even in future. ( 14 marks) [<Answer>](#)

The stock is expected to have a beta of 1.25 for the high growth period, and it is expected to decline linearly to 1.10 by the time the firm goes into steady state. The risk-free rate is 5.5%, and the market return is 10.5%.

You are **required** to estimate the present value of share, using the Three-Stage FCFE model.

2. Given below is the distribution of conditional returns and explicit probability distribution of stocks of Spark Ltd. and Electra Ltd. [<Answer>](#)

| Probability | Conditional Returns |              |
|-------------|---------------------|--------------|
|             | Spark Ltd.          | Electra Ltd. |
| 20%         | 90%                 | 11%          |
| 10%         | 75%                 | 29%          |
| 30%         | 60%                 | 33%          |
| 25%         | 20%                 | 60%          |
| 15%         | 30%                 | 55%          |

You are **required** to

- a. Calculate the expected returns, standard deviations of returns for both the stocks and correlation co-efficient between the stocks. ( 6 marks)
- b. Determine the expected rate of return of a zero-risk portfolio consisting of the above stocks. ( 5 marks)
3. A bond issued by Martin Ltd. is selling presently at the face value of Rs.100 and pays coupon at the rate of 11.5% p.a. (compounded annually) in arrears and will be redeemed at Rs.120.50 after 3 years. [<Answer>](#)
- a. The n year spot rate of interest,  $y_n$ , is given by  $y_n(\%) = 8.0 + 10$  for  $n = 1, 2$  and 3.

Assuming the pure expectations theory holds good, calculate

- i. The implied one year forward rates applicable at times  $t = 1$  and  $t = 2$
- ii. The value of the bond at time  $t = 0$

( 5 marks)

b. Assuming the term structure of interest rates is flat, calculate

- i. The duration of the above bond
- ii. Change in bond price for 50 basis point increase in interest rate

( 7 marks)

4. Mr. Rupam Sinha, a young analyst, is encouraged by the performance of TCS. He discovered that announcement regarding approval of a patent right has induced a sharp interest in the scrip. To check the market efficiency in semi strong form in the above case, Mr. Sinha has collected the following relevant information:

[<Answer>](#)

( 8 marks)

| Month & Year   | Closing Price of TCS (Rs.) | Closing Value of Market Index |
|----------------|----------------------------|-------------------------------|
| August 2006    | 969.70                     | 3,413.90                      |
| September 2006 | 1,044.30                   | 3,588.40                      |
| October 2006   | 1,129.70                   | 3,744.10                      |
| November 2006  | 1,148.15                   | 3,954.50                      |
| December 2006  | 1,136.95                   | 3,966.40                      |
| January 2007   | 1,323.95                   | 4,082.70                      |
| February 2007  | 1,315.45                   | 3,745.30                      |
| March 2007     | 1,303.02                   | 3,821.55                      |
| April 2007     | 1,247.50                   | 4,087.90                      |
| May 2007       | 1,272.90                   | 4,295.80                      |

Further using the data for previous years, the characteristic line arrived by Mr. Sinha is  $r_{s,t} = 4.73 + 0.62r_{m,t}$

Where  $r_{m,t}$  is % monthly return on market in any month  $t$

$r_{s,t}$  is % monthly return on TCS stock in the same month  $t$

You are **required** to conduct the residual analysis to test semi-strong form of market efficiency.

5. Consider the following data regarding convertible bonds issued recently by Shalini Textiles Ltd.:

[<Answer>](#)

|                                                                                   |   |          |
|-----------------------------------------------------------------------------------|---|----------|
| Face Value of the bond                                                            | = | Rs.1,000 |
| Coupon Rate of the bond                                                           | = | 9.5%     |
| Maturity                                                                          | = | 4 years  |
| Market price of the bond                                                          | = | Rs.1,025 |
| Market price of equity share                                                      | = | Rs.255   |
| Conversion rate (i.e., no. of shares that will be obtained on conversion of bond) | = | 4        |
| Latest dividend per share                                                         | = | Rs.4.5   |

Using Traditional Valuation Method for the above convertible bond you are **required** to calculate

- a. Annual cash flow differential. ( 1 mark)
- b. Break even period. ( 1 mark)
- c. Payback period. ( 3 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. Breadth of the market is popularly studied using A-D lines. Other techniques are also used along with the A-D lines by technical analysts for analyzing market breadth. Discuss.

[<Answer>](#)

(10 marks)

7. The Interest Rate Swap figures of the Indian Market appear to be impressive, but not yet been utilized to its full strength. Discuss.

[<Answer>](#)

(10 marks)

END OF SECTION C

END OF QUESTION PAPER

## Suggested Answers Security Analysis - I (MSF2D1) : January 2008

### Section A : Basic Concepts

| Answer | Reason                                                                                                                                                                                                                                                                                                                        |                                                               |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1. B   | P/BV ratio is affected by the required rate of return. When the required rate of return is high, P/BV ratio goes down. Hence, option (b) is the answer.                                                                                                                                                                       | <a href="#">≤</a><br><a href="#">TOP</a><br><a href="#">≥</a> |
| 2. E   | If a vertically rally or a decline is interrupted by a consolidation pattern akin to a rectangle, such a formation is called flags.                                                                                                                                                                                           | <a href="#">≤</a><br><a href="#">TOP</a><br><a href="#">≥</a> |
| 3. A   | Required rate of return = $R_f + \beta \times (R_m - R_f)$<br>= 6 + 1.5 (5.5)<br>= 14.25%<br>Terminal value at the end of the 3 <sup>rd</sup> year = $\frac{10.06 \times 1.045}{1.1425^3} = \text{Rs. } 107.82$<br>The present value of each share = $\frac{2.31}{1.1425} + \frac{107.82}{1.1425^3} = 25.9333$                | <a href="#">≤</a><br><a href="#">TOP</a><br><a href="#">≥</a> |
| 4. A   | Assuming pure expectations theory hold good, two years interest rate, $r_{0,2}$ will be calculated from following expressions.<br>$(1 + r_{0,2})^2 = (1 + r_{0,1}) (1 + f_{1,2}) = (1 + 0.0821) (1 + 0.0845) = 1.17$<br>$\Rightarrow r_{0,2} = \sqrt{1.17} - 1 = 8.33\%$<br>Hence liquidity premium<br>= 8.63 – 8.33 = 0.30%. | <a href="#">≤</a><br><a href="#">TOP</a><br><a href="#">≥</a> |
| 5. A   | Mismatch FRNs are also called rolling rate FRNs. Hence option (a) is the answer.                                                                                                                                                                                                                                              | <a href="#">≤</a><br><a href="#">TOP</a><br><a href="#">≥</a> |
| 6. E   | Contribution required to sinking fund = $\frac{i}{(1+i)^n - 1} = \frac{0.075}{(1+0.075)^7 - 1} = 11.38\%$                                                                                                                                                                                                                     | <a href="#">≤</a><br><a href="#">TOP</a>                      |

Interest rate of bonds = 7.5%, hence total payment of bonds = 7.5% + 11.38% = 18.88%. ≥

Calculation of capitalization rate

| Instruments | Employed (%) | Required rate (%) | Weighted rates (%) |
|-------------|--------------|-------------------|--------------------|
| Equity      | 35           | 20.00             | 7.00               |
| Bonds       | 65           | 18.88             | 12.27              |
|             |              |                   | 19.27              |

Therefore the capitalization rate is = 19.27%

7. B When yield and coupon are constant, the maturity of a bond and convexity are directly related. Hence option (b) is the answer. ≤  
TOP  
≥
8. D In futures contract, trades have to pay daily settlement margin depending on the movement in the price of the underlying stock. Hence option (d) is false. ≤  
TOP  
≥
9. B 
$$180 = (0.55)^2 \times 361 + (0.45)^2 \times 225 + 2 \times 0.55 \times 0.45 \times P_{\text{bond}} \times 19 \times 15$$
  

$$180 = 154.77 + 141.08 + P_{\text{bond}} \times 19 \times 15$$
  

$$P_{\text{bond}} = \frac{180 - 154.77 - 141.08}{19 \times 15} = 0.1788$$
 ≤  
TOP  
≥
10. C Cash earning per share =  $\frac{\text{PAT} - 50 \text{ lakh}}{15 \text{ lakh}}$  ≤  
TOP  
≥  
 Therefore, PAT = 175 lakhs.  
 Net Profit margin = PAT/Sales = 175/540 = 32.41%  
 Therefore, Option (c) is the correct answer.
11. B According to liquidity premium theory investors are not indifferent to risk and they charge higher rates than the expected future rates, if the maturity of the instrument increases. ≤  
TOP  
≥
12. A This model cannot be implemented by regressing cross-sections of bond returns on their Durations. Hence option (a) is false. ≤  
TOP  
≥
13. D The price of the bond is  

$$= 37.5 \times \text{PVIFA}_{3\%, 30\text{years}} + 1000 \times \text{PVIF}_{3\%, 30\text{years}}$$
  

$$= 1147.02$$
  
 Yield to call  

$$1147.02 = 37.5 \times \text{PVIFA}_{i\%, 10\text{years}} + 1130 \times \text{PVIF}_{i\%, 10\text{years}}$$
  

$$i = 3.14\%$$
  
 Annually =  $3.14 \times 2 = 6.28\%$ . ≤  
TOP  
≥
14. A Group or associate company performances, support and synergy are considered for assessment of unit evaluation. Hence option (a) is true. ≤  
TOP  
≥
15. B Adding 1 to both sides of the equation we get:  

$$\frac{\text{Total debt}}{\text{Equity}} + 1 = \frac{\text{Total debt} + \text{equity}}{\text{Equity}} = \frac{\text{Total assets}}{\text{Equity}} = \frac{5600}{3360} = 1.6667$$
  
 From above, Equity =  $\frac{5600}{1.6667} = \text{Rs. } 3,360$   
 Now, total assets = Total debt + equity = Rs.5,600  
 or Total debt + 3,360 = 5,600  
 or Total debt = 5600 – 3360 = Rs.2,240  
 Long term debt = Total debt – Short term debt = 2240 – 450 = Rs.1,790. ≤  
TOP  
≥
16. C All statement are correct except statement III. The higher the expected interest rate volatility, the lower the OAS. Similarly the lower the expected interest rate volatility, the higher the OAS. ≤  
TOP  
≥

17. B  $P_0 = \frac{3.5}{0.12} = 65.50$  [≤](#)  
[TOP](#)  
[≥](#)  
 $= \frac{0.12}{0.12} = 65.50$   
 $3.5 + 3.5g = 11.79 - 65.50g$   
 $69g = 8.29$   
 $g = 12.01\%$
18. C The exponent for the 100-day EMA is  $2/100 = 0.02$  [≤](#)  
[TOP](#)  
[≥](#)  
Difference in EMA =  $(84 - 73) \times (0.02) = 0.22$   
100 day EMA for day 3 =  $73.00 + 0.22 = \text{Rs. } 73.22$
19. B Value stock usually have PEG ratio less than one because the stocks earnings expectations have risen and the market has not yet recognized the growth potential. Hence option (II) is false. [≤](#)  
[TOP](#)  
[≥](#)
20. C A steep trendline is easily violated by small sideward movements in the price chart, and is not particularly useful in identifying reversals. Hence option (c) is true. Other statements are false. [≤](#)  
[TOP](#)  
[≥](#)
21. E Statement II relates to Bond of Investment method. Statement III relates to Built-up method. [≤](#)  
[TOP](#)  
[≥](#)
22. B Statement I, II and IV are correct with respect to KRD. The major drawback of effective duration measure is that it is calculated based on the assumption of parallel shifts in the yield curve. To overcome this, an alternative measure used for different types of yield curve shifts is "Key Rate Duration" popularly referred to as KRD. [≤](#)  
[TOP](#)  
[≥](#)
23. D The maximum possible gain per share when spot price exceeds strike price of Rs.55 is  $(50 - 45.5 + 2) = \text{Rs. } 6.50$ . [≤](#)  
[TOP](#)  
[≥](#)
24. A The applications of ex-ante SMLs are: [≤](#)  
[TOP](#)  
[≥](#)  
I. Identifying undervalued securities.  
II. Determining the consensus, 'price of risk' implicit in current market prices.  
Other statements are the applications of ex-post SML's. Hence option (a) is said to be correct answer.
25. A Volume is very high at the left shoulder and continues to rise, albeit at a lower rate at the head. Hence option (a) is false. [≤](#)  
[TOP](#)  
[≥](#)
26. C Modified duration =  $\frac{1}{1 + \frac{YTM}{p}}$  Where p is frequency of coupon payment. [≤](#)  
[TOP](#)  
[≥](#)  
 $= \frac{1}{1 + \frac{0.125}{2}} = 6.32 \text{ years}$
27. E If market price is more than face value, the coupon rate will be higher than the discount rate or the YTM. As current yield is coupon income/market value, when market value is more than the face value, the current yield will be lower than the coupon rate. Hence, when  $MP > FV$ , coupon rate > Current yield > YTM and the answer is (e). [≤](#)  
[TOP](#)  
[≥](#)  
When  $MP = FV$ , coupon rate should be equal to YTM = current yield. Hence, (a) and (b) are incorrect. When  $MP < FV$ , coupon rate < Current yield < YTM. Hence, (c) and (d) are also incorrect.
28. C A decline in this index would indicate more purchases in relation to sales by small investors, suggesting they are optimistic. Hence option (c) false. [≤](#)  
[TOP](#)  
[≥](#)
29. C Alternative a) and b) are not correct as only historical and publicly held information are discounted by them respectively. [≤](#)  
[TOP](#)  
[≥](#)  
Alternative d) is not correct as in the near strong form the analysis made by analysts and the experts e.g. mutual funds in the field is discounted by the market.  
In only super strong form of market efficiency the insider information is discounted by the market.

30. D Purchase price = Rs. 1088.38  
 Selling price = Rs. 1184.52  
 Total return = 211.14  
 = 19.40%  
 Therefore, option (d) is the correct answer.

[≤](#)  
[TOP](#)  
[≥](#)

### Section B : Problems

1. Value of the stock = PV of FCFE in high growth phase + PV of FCFE in transition phase + PV of terminal price at the end of transition period.

[< TOP >](#)

FCFE = Earnings – (Capital Expenditure – Depreciation) (1 – debt ratio) – (Change in working capital) (1- debt ratio)

| High Growth Period            | 1    | 2    | 3    | 4    | 5    |
|-------------------------------|------|------|------|------|------|
| Growth rate                   | 18%  | 18%  | 18%  | 18%  | 18%  |
| Earnings                      | 2.66 | 3.13 | 3.70 | 4.36 | 5.15 |
| Cap Exp - Depreciation (a)    | 0.39 | 0.46 | 0.54 | 0.64 | 0.76 |
| Change in working capital (b) | 1.49 | 1.76 | 2.08 | 2.45 | 2.89 |
| (c) = (a) + (b)               | 1.88 | 2.22 | 2.62 | 3.09 | 3.65 |
| (c) (1- debt ratio)           | 1.65 | 1.95 | 2.31 | 2.72 | 3.21 |
| FCFE                          | 1.01 | 1.18 | 1.39 | 1.64 | 1.94 |
| beta                          | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |

|                |        |        |        |        |        |
|----------------|--------|--------|--------|--------|--------|
| Cost of equity | 1.1175 | 1.1175 | 1.1175 | 1.1175 | 1.1175 |
| PV             | 0.90   | 0.94   | 1.00   | 1.05   | 1.12   |

|                               |        |        |        |        |                       |
|-------------------------------|--------|--------|--------|--------|-----------------------|
| Transition Period             | 6      | 7      | 8      | 9      | 10<br>(Stable growth) |
| Growth rate                   | 16%    | 14%    | 12%    | 10%    | 8%                    |
| Earnings                      | 5.97   | 6.81   | 7.63   | 8.39   | 9.06                  |
| Cap Exp - Depreciation (a)    | 0.88   | 1.00   | 1.12   | 1.23   | —                     |
| Change in working capital (b) | 3.03   | 3.08   | 3.01   | 2.81   | 2.48                  |
| (c) = (a) + (b)               | 3.91   | 4.08   | 4.13   | 4.04   | 2.48                  |
| (c) (1- debt ratio)           | 3.44   | 3.59   | 3.63   | 3.56   | 2.18                  |
| FCFE                          | 2.53   | 3.22   | 3.99   | 4.83   | 6.88                  |
| beta                          | 1.22   | 1.19   | 1.16   | 1.13   | 1.10                  |
| Cost of equity                | 1.1160 | 1.1145 | 1.1130 | 1.1115 | 1.1100                |
| PV of FCFE                    | 1.30   | 1.49   | 1.65   | 1.80   |                       |

|                                            |           |
|--------------------------------------------|-----------|
| FCFE in terminal year                      | Rs.6.88   |
| Terminal Value at the end of year 9        | Rs.229.33 |
| PV of Terminal Value (a)                   | Rs.85.52  |
| Cost of equity                             | 11.10%    |
| Total of cash flow of growth phase (b)     | 5.02      |
| Total of cash flow of transition phase (c) | 6.25      |
| Value of the stock (a+b+c)                 | 96.76     |

\*Terminal value at the end of year 9 =  $6.88 / (0.11 - 0.08) = 229.33$

\*PV of terminal value =  $229.33 / [(1.1175)^5 \times 1.1160 \times 1.1145 \times 1.1130 \times 1.1115] = \text{Rs.}85.52$

**\*Working note:**

Computation of Change in working capital:

| Year | Revenue Per Share | working capital<br>(0.70 x Revenue) | Change in W.C |
|------|-------------------|-------------------------------------|---------------|
| 0    | 11.84             | 8.29                                |               |
| 1    | 13.97             | 9.78                                | 1.49          |
| 2    | 16.49             | 11.54                               | 1.76          |
| 3    | 19.45             | 13.62                               | 2.08          |
| 4    | 22.96             | 16.07                               | 2.45          |
| 5    | 27.09             | 18.96                               | 2.89          |
| 6    | 31.42             | 21.99                               | 3.03          |
| 7    | 35.82             | 25.07                               | 3.08          |
| 8    | 40.12             | 28.08                               | 3.01          |
| 9    | 44.13             | 30.89                               | 2.81          |
| 10   | 47.66             | 33.37                               | 2.48          |

2. a. **Spark Stock**

[< TOP >](#)

| $R_{(S)}$ | $P_i$ | $P_i R_S$ | $(R_S - E_{(S)})$ | $P_i [(R_S - E(E_S))]^2$ |
|-----------|-------|-----------|-------------------|--------------------------|
| 90%       | 0.20  | 18        | 37                | 273.8                    |
| 75%       | 0.10  | 7.5       | 22                | 48.4                     |
| 60%       | 0.30  | 18        | 7                 | 14.7                     |
| 20%       | 0.25  | 5         | - 33              | 272.25                   |
| 30%       | 0.15  | 4.5       | - 23              | 79.35                    |

$$\Sigma P_i R_S = 53\%$$

$$P_i [(R_S - E(E_S))]^2 = 688.50\%$$

$$E_{(S)} = 53\%$$

$$\sigma_S = \sqrt{688.5} = 26.24\%.$$

**Electra Stock**

| $R_{(E)}$ | $P_i$ | $P_i R_E$ | $(R_E - E_{(E)})$ | $P_i (R_E - E_E)^2$ |
|-----------|-------|-----------|-------------------|---------------------|
| 11%       | 0.20  | 2.2       | - 27.25           | 148.51              |
| 29%       | 0.10  | 2.9       | - 9.25            | 8.56                |
| 33%       | 0.30  | 9.9       | - 5.25            | 8.27                |
| 60%       | 0.25  | 15        | 21.75             | 118.27              |
| 55%       | 0.15  | 8.25      | 16.75             | 42.08               |

$$\Sigma P_i R_E = 38.25\%$$

$$\Sigma P_i [(R_E - E_E)^2] = 325.69\%$$

$$E_{(E)} = 38.25\%$$

$$\sigma_E = \sqrt{325.69}$$

$$= 18.05\%$$

#### Covariance between two stocks

| $P_i$ | $(R_S - E_S)$ | $(R_E - E_E)$ | $P_i (R_S - E_S) \times (R_E - E_E)$ |
|-------|---------------|---------------|--------------------------------------|
| 0.20  | 37            | - 27.25       | - 201.65                             |
| 0.10  | 22            | - 9.25        | - 20.35                              |
| 0.30  | 7             | - 5.25        | - 11.03                              |
| 0.25  | - 33          | 21.75         | - 179.44                             |
| 0.15  | - 23          | 16.75         | - 57.79                              |

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

$$\text{COV}_{(S \& E)} = - 470.26$$

$$\text{Correlation coefficient} = \frac{\text{COV}_{(S \& E)}}{\sigma_S \sigma_E}$$

$$= \frac{- 470.26}{26.24 \times 18.05} = - 1$$

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

$$\sigma_P^2 = W_1^2 \sigma_1^2 + W_2^2 \sigma_2^2 + 2W_1 W_2 \rho_{12} \sigma_1 \sigma_2$$

$$\sigma_P^2 = (W_1 \sigma_1 - W_2 \sigma_2)^2$$

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

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

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

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

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

Putting the value of  $W_2$  in equation (i)

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

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

$$26.24 W_1 = (1 - W_1) 20.50$$

$$(26.24 + 20.50) W_1 = 20.50$$

$$W_1 = \frac{20.50}{26.24 + 20.50} = 43.86\%$$

$$W_2 = 1 - 0.4386 = 0.5614 = 56.14\%$$

Expected return of risk free portfolio

$$= 0.4386 \times 53 + 0.5614 \times 37.80$$

$$= 44.47\%.$$

3. a. i. We can find forward rates  $f_{1,1}$  and  $f_{2,1}$  using the spot rates  $y_1$ ,  $y_2$  and  $y_3$ :

[< TOP >](#)

$$(1 + y_2)^2 = (1 + y_1)(1 + f_{1,1}) \text{ and}$$

$$(1 + y_3)^3 = (1 + y_2)^2 (1 + f_{2,1})$$

For  $f_{1,1}$

$$(1.082)^2 = (1.081)(1 + f_{1,1})$$

$$f_{1,1} = 0.083 \text{ i.e. } 8.3\%$$

For  $f_{2,1}$

$$(1.083)^3 = (1.082)^2 (1 + f_{2,1})$$

$$\Rightarrow f_{2,1} = 8.05 \text{ i.e. } 8.5\%$$

- ii. The value of the bond at  $t = 0$

$$= 11.5 (\text{PVIF}_{8.1\%,1} + \text{PVIF}_{8.2\%,2} + \text{PVIF}_{8.3\%,3}) + 115 \times \text{PVIF}_{8.3\%,3}$$

$$= 11.5 (0.9251 + 0.8558 + 0.7916) + 115 \times 0.7916 = \text{Rs.}120.62$$

- b. i.  $100 = 11.5 \text{ PVIFA}(r,3) + 120.50 \text{ PVIF}(r,3)$

$$r = 16.86\%.$$

Duration

| Year | C.F   | P.V. of C.F at<br>16.86% | Year x P.V. of C.<br>F |
|------|-------|--------------------------|------------------------|
| 1    | 11.5  | 9.84                     | 9.84                   |
| 2    | 11.5  | 8.42                     | 16.84                  |
| 3    | 132.0 | 82.71                    | 248.13                 |
|      |       | 100.97                   | 274.81                 |

$$\text{Duration} = \frac{100.97}{100} = 1.272 \text{ years}$$

- ii.  $D_{\text{mod}} = 1 - \frac{1}{1 + 0.1686} = 2.33 \text{ years}$

$$\frac{\Delta P}{P} \times 100 = -D_{\text{mod}} \times \frac{\Delta r}{r}$$

$$= -2.33 \times 100$$

$$= -1.165\%$$

i.e., 1.165% fall in bond price.

$$\text{Therefore new price} = 100 \times (1 - 0.01165) = \text{Rs.}98.84$$

4.

[< TOP >](#)

| Months<br>(I)  | Actual Return<br>on stock (%)<br>(II) | Return on<br>Index (%)<br>(III) | Expected return<br>on TCS<br>stock using<br>characteristic line<br>(IV) | Above normal<br>return %<br>(V) = (II) – (IV) |
|----------------|---------------------------------------|---------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|
| August 2006    |                                       |                                 | –                                                                       |                                               |
| September 2006 | 7.69                                  | 5.11                            | 7.90                                                                    | -0.21                                         |
| October 2006   | 8.18                                  | 4.34                            | 7.42                                                                    | 0.76                                          |
| November 2006  | 1.63                                  | 5.62                            | 8.21                                                                    | -6.58                                         |
| December 2006  | -0.98                                 | 0.30                            | 4.92                                                                    | -5.90                                         |

|                                   |       |       |       |        |
|-----------------------------------|-------|-------|-------|--------|
| January 2007                      | 16.45 | 2.93  | 6.55  | 9.90   |
| February 2007                     | -0.64 | -8.26 | -0.39 | -0.25  |
| March 2007                        | -0.94 | 2.04  | 5.99  | -6.93  |
| April 2007                        | -4.26 | 6.97  | 9.05  | -13.31 |
| May 2007                          | 2.04  | 5.09  | 7.89  | -5.85  |
| $\Sigma$ Above normal return<br>= |       |       |       | -28.37 |

From the above computation we observe that sum of abnormal return is not close to zero. Therefore, we conclude that market is not efficient in semi-strong form.

[< TOP >](#)

5. a. Cash flow differential

$$\begin{aligned}
 &= \text{Face value} \times \text{Coupon rate} - \left( \frac{4.5}{225} \right) \times \text{Conversion value} \times \text{Dividend yield} \\
 &= 1000 \times 0.095 - (225 \times 4) \times \left( \frac{4.5}{225} \right) \times 13.89\% \\
 &= 95 - 18 = \text{Rs.77.}
 \end{aligned}$$

b. Break-even period =

$$\begin{aligned}
 &= \frac{95 - 18}{1025 - 225 \times 4} = \frac{77}{125} = 0.616 \text{ years} \\
 &= 0.616 \times 12 = 7.39 \text{ months}
 \end{aligned}$$

c. Payback period =

Premium over conversion value = Current market price of the bond – Current share price × Number of shares

$$\begin{aligned}
 &= 1025 - 225 \times 4 = 125 \\
 \% \text{ Premium} &= \frac{125}{900} \times 100 = 13.89\%
 \end{aligned}$$

On substituting the values,

$$\text{Payback period} = \frac{95}{1025 - 225 \times 4} = \frac{95}{125} = 0.76 \text{ years} = 0.76 \times 12 = 9.12 \text{ months}$$

### Section C: Applied Theory

6. The four popular methods are

[< TOP >](#)

- Stocks in positive trends
- Percentage of stocks over a moving average
- Diffusion indexes
- High-Low statistics

i. **Stocks in Positive Trends**

A stock which rallies after a decline to reach a new high is said to be in an uptrend; a stock that reacts to reach a new low is said to be in a downtrend. The percentage of stock in an uptrend to the total stock traded is computed and plotted on a graph. A rising market is expected to have an increasing percentage of uptrend stock. Reversal is signaled when stock in positive trend begin to diminish.

ii. **Percentage of Stock Over a Moving Average**

A specific moving average for a number of stocks is first computed, and the percentage of the number that is above the average is ascertained. The percentage of stocks over a moving average increases in a bull market, and generally moves along with the positive trend index computed in (i) above. When the percentage of stocks over a moving average reaches an extreme of 90-100 percent or 10-15 percent, it indicates that a substantial proportion of the prevailing move has taken place and that reversal is imminent. When the percentage index reverses direction, the reversal in market trend is almost immediate.

iii. **Diffusion Index**

A diffusion index momentum index is computed by calculating the rate at which a certain group of stocks change price over a given period of time. It is generally calculated on either a wide number of stocks, or a number of industry indexes. Also called the momentum index, a rise in the index signals the onset of a bull market and vice versa.

#### iv. **High-Low Statistics**

Technical analysts also study the high-low statistics to confirm market trends. A rising market should be accompanied by a healthy number of net new highs. A graph of a net new highs can be plotted to be read along with a market index. If net new highs trace a series of declining peaks while the index continues to rise, a reversal is imminent. Similarly, a graph of net new lows can be expected to signal the end of a bear market, when it does not confirm the new trough reached by the market index. This is because, a declining number of stocks reaching new lows implies that larger number of stocks are resisting the downtrend in the market index, and thus signifies the end of a bear market.

Breadth of the market, thus, is an important indicator of the depth of the prevailing trend, and is of immense utility to the analyst in identifying trend reversals.

7. The attractiveness of interest rate swaps remains limited to banks and financial institutions. The majority of the corporates are constrained because of several factors as listed below.

[< TOP >](#)

i. **Absence of standard benchmark rate:** In the international market, there is a well-developed interbank rate which is LIBOR. Most of the players are confident about 3-month LIBOR or 6-month LIBOR. But the absence of adequate liquidity in the Indian market has resulted in non-development of an appropriate benchmark rate. Although MIBOR rates are being used for interest rate swap contracts, long-term MIBOR rates are yet to gain confidence among the players. The long-term benchmark rates available in the market are yet to be strong enough to generate confidence among the parties entering into interest rate swap contract.

ii. **No proper market for Floating Rate Loans:** The peculiar feature of Indian financial markets is that there is uniformity in thinking among the players. Because the interest rates do not fluctuate widely, the demand for floating rate loans also does not pick-up. This is a major factor responsible for poor growth of interest rate swap market. But the recent guidelines and policies of the RBI allowing the market to determine the market interest rate may increase volatility of the interest rate, which in turn would help popularize the interest rate swaps.

iii. **Absence of standard yield curve in the market:** It is important for a derivative market to have a proper yield curve because it facilitates determination of the bid-ask spread and forward market movements. A proper yield curve with respect to the Indian Rupee market is yet to be developed. The players have very little confidence on the existing yield curve.

iv. **Skepticism in the players:** The players in the financial market are skeptical to reap the full advantage of economic liberalization. Very few banks have resorted to innovative practices. Uniformity in practice is yet to gain momentum. For example, very few banks have adopted differential PLR. The growth in interest rate swap can pick-up if more and more banks declare differential PLRs.

v. **Poor information:** Lack of proper information about the interest rate swap itself hinders the growth. The Swap market is still in its nascent growth stage. The participants in the market have yet to learn the trade. Mastering the trade is a distant dream. This inadequate knowledge forbids the players to take up large scale interest rate swap transactions.

vi. Till now the banks and financial institutions have perceived that interest rate swap benefits can only be reaped by the large-scale corporates. The small banks and corporate houses have little to benefit from these transactions. This perception forbids the small banks and corporates to go for the interest rate swap contract. It is necessary that these small houses realize that they can also get advantage from entering into interest rate swap if proper attention is being paid to these contracts.

Thus, apart from the above underlying broad factors, few other factors are also responsible for prohibiting the growth of interest rate swap contracts. They are:

- i. Unstable political environment
- ii. Slower implementation of economic reforms
- iii. Absence of liquidity in the debt market
- iv. Cheaper accessibility to funds
- v. Core emphasis on the growth of stock market than on derivative markets
- vi. Lack of strong underlying assets for derivative markets

[< TOP OF THE DOCUMENT >](#)

