

Question Paper

Security Analysis I (211) : October 2004

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. Two bonds, X and Y, are presently selling at their par value of Rs.100. Each pays an interest of Rs.9 annually. Bond X will mature in 5 years while bond Y will mature in 6 years. Which of the following statements is **true** if the yields to maturity on the two bonds change from 9% to 8%?

[< Answer >](#)

- (a) Both bonds will increase in value, but bond X will increase more than bond Y
- (b) Both bonds will decrease in value, but bond X will decrease more than bond Y
- (c) Both bonds will increase in value, but bond Y will increase more than bond X
- (d) Both bonds will decrease in value, but bond Y will decrease more than bond X
- (e) Both bonds will increase by same value.

2. Consider the following information:

[< Answer >](#)

Stock	Return	Variance	Weight in the portfolio
A	14%	324 (%) ²	0.60
B	11%	196 (%) ²	0.40

If the variance of the portfolio is 115 (%)², the coefficient of determination between the stocks return is

- (a) 0.074
- (b) -0.273
- (c) 1.200
- (d) -0.074
- (e) 0.273.

[< Answer >](#)

3. Which of the following is/are **true** if a firm has a market to book value ratio that is equivalent to the industry average and an ROE that is less than the industry average?

- (a) The firm is more profitable than other firms in the industry
- (b) The firm is more likely to avoid insolvency in the short run than other firms in the industry
- (c) The firm has a higher P/E ratio than other firms in the industry
- (d) The firm is utilizing its assets more efficiently than other firms in the industry
- (e) Both (a) and (c) above.

[< Answer >](#)

4. Which of the following is/are **true** if a firm has a required rate of return equal to the ROE?

- I. The amount of earnings retained by the firm does not affect market price or the P/E.
- II. The firm can increase market price and P/E by increasing the growth rate.
- III. The P/E ratio is inversely proportional to the ROE of the firm.

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

5. During periods of inflation, the use of FIFO (rather than LIFO) as the method of accounting for inventories causes

[< Answer >](#)

- (a) Higher inventory turnover
- (b) Higher reported sales
- (c) Lower ending inventory
- (d) Higher income taxes
- (e) Lower profits.

6. A convertible bond with a face value of Rs.1,000 has been issued at Rs.1,350 with a coupon rate of 10.5%. The conversion rate is 14 shares per bond. The current market price of the bond is Rs.1,475 and

[< Answer >](#)

that of stock is Rs.80. The premium over conversion value is

- (a) 24.06% (b) 33.33% (c) 31.70% (d) 37.25% (e) 52.00%.

[< Answer >](#)

7. Mr. Arvind holds a stock of company X. Company X is presently paying a dividend of Rs.1.5 per share and required rate of return for Mr. Arvind is 15 percent. If the dividends are expected to grow at a constant rate of 8 percent, duration of equity is

- (a) 20.2 years (b) 5.4 years (c) 11.6 years (d) 15.4 years (e) 4.3 years.

[< Answer >](#)

8. Which of the following measures the sensitivity of duration to change in the interest rates?

- (a) Interest rate elasticity (b) Modified duration
(c) Convexity (d) Current yield (e) Yield to maturity.

[< Answer >](#)

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

	Security A	Security B
Expected Return (%)	10.50	14.75
Standard deviation of returns (%)	25.25	35.75
Beta	0.85	1.45

Standard deviation of returns on the market index is 18 %. The systematic risk of a portfolio consisting of these two securities in equal proportions is

- (a) $24.63(\%)^2$ (b) $428.49(\%)^2$ (c) $529.00(\%)^2$
(d) $675.25(\%)^2$ (e) $875.25(\%)^2$.

[< Answer >](#)

10. The average daily price change in coffee futures contract is Rs3.25 per kg and the standard deviation of the price changes is Rs.0.65 If the size of the contract is 1000 kgs, the initial margin required is

- (a) Rs.1,000 (b) Rs.2,000 (c) Rs.5,200 (d) Rs.5,500 (e) Rs.6,000.

[< Answer >](#)

11. Closing prices of the stock of Future Corporation is given below:

Day	Closing Price (Rs.)
1	125.45
2	135.25
3	132.75
4	142.75
5	145.25

The relative strength of the stock is

- (a) 0.9875 (b) 1.0255 (c) 1.0628 (d) 1.1185 (e) 1.1250.

[< Answer >](#)

12. Consider the following data for a stock:

Current abnormal growth rate = 10%
Normal growth rate = 5 %
Current dividend per share = Rs.2.00
Required rate of return = 12%

If the time period during which the current abnormal growth rate will become normal growth rate is 5 years, the premium on the stock due to abnormal growth rate is

- (a) Rs.1.25 (b) Rs.2.15 (c) Rs.3.57
(d) Rs.4.11 (e) Rs. 5.27.

[< Answer >](#)

13. According to Security Market line

- I. The steeper the slope of the ex-ante SML, the more averse investors are to assuming additional risk.
- II. The steeper the slope of ex-ante SML, the less averse investors to assuming additional risk.
- III. Under priced securities plot above ex-post SML.

IV. Overpriced securities plot below ex-post SML.

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

[< Answer >](#)

14. A bond's duration equals to its maturity under which of the following conditions?

- I. The bond's coupon rate equals the market interest rate.
- II. The bond pays no coupon.
- III. The bond is a deep discount bond.
- IV. The bond pays a single period cash flow.

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

[< Answer >](#)

15. Speculative blow off means

- (a) The loss incurred by a speculator by too much of speculation
- (b) After a slow expansion over a period, sometimes both prices and volume work into an exponential rise, this is indicative of heavy off-loading by bulls
- (c) At the end of a bearish phase, the last group of bears sell the stock and prices fall for considerable time at an accelerated pace and are accompanied by expanding volume
- (d) The gain accrued to an investor in a bearish market
- (e) The loss incurred in bullish market.

[< Answer >](#)

16. Which of the following is/are **false** in relation to term structure of interest rates?

- I. Yield curve cannot have a negative slope
- II. Yield spreads between high and low grade corporate bonds tend to widen during a boom period in the economy
- III. Riding the yield curve is strategy requires purchase of short term bonds when the yield curve is sloped upwards and expected to maintain the same level and slope.

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

[< Answer >](#)

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

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

[< Answer >](#)

18. In which of the following stage of a industry life cycle, the product penetrates the market place and becomes more commonly used?

- (a) Pioneering stage
- (b) Expansion stage
- (c) Stabilization stage
- (d) Declining stage
- (e) Maturity stage.

[< Answer >](#)

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

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

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

20. Which of the following indicates the presence of an intense rivalry in a particular industry?

[< Answer >](#)

- I. Numerous or equally balanced competitors.
- II. High growth rate of the industry.
- III. High fixed cost.
- IV. Presence of differentiation or switching costs.

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

21. The following regression equation reflects the relationship of Blue moon stock's return with the market return

[< Answer >](#)

$$r_{BM} = 0.40 + 0.75r_m$$

If the market index rises by 12.5% and Blue moon's stock price rises by 8.45%, the abnormal change in Blue moon's stock price is

- (a) - 0.925%
- (b) - 1.25%
- (c) + 0.925%
- (d) - 1.75%
- (e) + 1.85%.

22. Which of the following is/are **true** if a bond is selling at its face value?

[< Answer >](#)

- I. The change in the price of the bond is more when yield decreases by 1% than the change in the price of the bond if yield increases by 1%.
- II. YTM of the bond is equal to its coupon rate.
- III. YTM of the bond is equal to its reinvestment rate.

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

23. If the credit rating of an ordinary plain vanilla bond is downgraded, then in which of the following ways would the bond respond?

[< Answer >](#)

- (a) The bond's market price rises
- (b) The bond's indenture contract is revised
- (c) The bond's coupon rate falls
- (d) The bond's yield to maturity rises
- (e) The bond's yield to maturity falls.

24. Which of the following types of investments experience the least interest rate risk?

[< Answer >](#)

- (a) Zero coupon bonds
- (b) Long term government bonds
- (c) Preferred stock
- (d) Long term corporate bonds
- (e) Short term treasury bills.

25. Which of the following statement(s) is/are **true**?

[< Answer >](#)

- I. YTM depends upon interest income as well as the expected capital gains on maturity.
- II. The closer a bond is to maturity, the less sensitive the price of the bond is to interest rate changes.
- III. Callable debt is debt that may be paid off early.

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

[< Answer >](#)

26. An in-the-money call option is one that

- I. Has an exercise price below the current market price of the underlying security
- II. Has positive value if buyer exercises it
- III. Has an exercise price above the current market price of the underlying security.

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

27. The writer of a put option on stock has

[< Answer >](#)

- (a) The choice to deliver the shares or take cash payoff
- (b) The choice of offset with buying a call option
- (c) The obligation to deliver the shares at exercise price
- (d) The obligation to buy the shares at exercise price
- (e) The choice of exercising the put or not.

28. Which of the following statements is **true** of the constant growth Dividend Discount Model?

[< Answer >](#)

- I. It assumes that each future dividend is $(1 + g)$ times greater than the prior dividend.
- II. Assumes that the discount rate is greater than the growth rate.
- III. Assumes that the increase in growth rate is constant over time.

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

29. Consider the following information related to a bond:

[< Answer >](#)

Par Value	Rs. 1000
Time to Maturity	15 years
Coupon rate (Interest payable annually)	8%
Current Market Price	Rs. 847.88
Yield to Maturity (YTM)	10%

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) +0.425%
- (b) -0.425%
- (c) -0.189%
- (d) +3.25%
- (e) + 0.189%.

30. Which of the following principles is **true** while analyzing trend line penetrations?

[< Answer >](#)

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

END OF SECTION A

Section B : Problems (50 Marks)

- This section consists of questions with serial number 1 – 6.
- 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. White Clouds Ltd. has made a public issue of convertible debentures of face value of Rs.100 with annual coupon of 12%. Each debenture has two parts – A and B. Part A, 50% of the face value will be converted into one equity share after one year from the date of allotment and Part B, the remaining 50% of the face value, will have a warrant attached to it.

The following are the options available to the investor:

- (i) Exchange Part B and warrant for one equity share at the end of the 3rd year.
- (ii) Retain Part B and let the warrant lapse. In that case, Part B will be redeemed at the end of the 5th year.

The current EPS of the company is Rs.8 and its dividend payout ratio is 30%. The face value of equity share of the company is Rs.10. The company's earnings were growing at a rate of 20% p.a. for the past 5 years but the growth rate is expected to be 17% p.a. for the next 5 years and stabilize at 8% p.a. thereafter. Dividend payout ratio remains constant. The required rate of return of the equity shareholders is 14%.

Assume that at the end of 5th year the equity shares are traded at their intrinsic value.

You are required to determine whether it is desirable to invest in the debentures of the company or not and if yes, which of the options of the bond should be chosen. Assume that the required rate of return on convertible bond is 20% and the investor wants to sell all the equity holdings at the end of the 5th year.

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

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

Day	Advances	Declines	Total
1	70	125	199
2	80	118	199
3	125	69	199
4	130	60	199
5	144	54	199
6	150	45	199
7	84	110	199

Calculate:

- a. Short period A-D line
- b. Long period A-D line.

(2 + 4 = 6 marks) [< Answer >](#)

3. Mr. Nimit Singh is holding two bonds A and B which pay an annual coupon of 6% and 8% and their terms to maturity are 4 years and 5 years, respectively. The face value and maturity value of the bonds is Rs.100. Spot rates prevailing in the market as indicated by the yield curve are:

Maturity (Years)	Spot rates
1	4.00%

2	5.00%
3	5.60%
4	6.10%
5	6.75%

You are **required** to calculate

- The expected change in the prices of bonds A and B using the duration concept, for a 0.40% change in yield to maturity.
- The one year holding period return on the bonds assuming that spot rates will rise in twelve month's time by 0.15%, across the maturity spectrum.

(10 + 2 = 12 marks) [< Answer >](#)

- Mr. Sivam Gupta is a young analyst who is encouraged by the performance of Optima Labs. 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. Gupta has collected the following relevant information:

Month	Closing Price of Optima Labs (Rs.)	Closing Value of Market Index
November, 2003	125.25	1015
December, 2003	135.25	1085
January, 2004	145.25	1095
February, 2004	156.75	1110
March, 2004	136.75	1090
April, 2004	175.25	1150
May, 2004	205.25	1175
June, 2004	225.25	1215
July, 2004	215.25	1285
August, 2004	245.25	1345

Further using the data for 3 previous years, the characteristic line arrived by Mr. Gupta is

$$r_{s,t} = 4.52 + 0.78r_{m,t}$$

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

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

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

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

- Consider the given data on three similar properties

Property	Rental Value (Rs.)	Electricity Charges (Rs.)	Water charges (Rs.)	Market Value (Rs. in lakhs)
X	8,000	760	300	15.0
Y	5,750	525	200	11.0
Z	3,175	415	165	6.5

Assume that electricity and water charges are not expected to vary greatly from above values.

You are **required** to calculate the average capitalization rate.

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

6. A market index consists of the following stocks. Their prices and number of outstanding shares are as follows:

Stock	Price (Rs.)	Number of Shares Outstanding
A	10	100,000
B	20	10,000
C	30	200,000
D	40	50,000

- a. If price of the stock C doubles to Rs.60 and averaging is done using arithmetic mean
- What is the percentage increase in the market index if it is a market value weighted index?
 - What is the percentage increase in the market index if it is an equal weighted price- index?
- b. Suppose the price of stock B had doubled instead of stock C. How would the market Index have fared using the aggregate measures employed in (a)? Why are your answers different?

(4 +3 =7 marks) [< Answer >](#)

END OF SECTION B

Section C : Applied Theory (20 Marks)

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

7. Low interest rates and a flat yield curve are both vital to the growth of domestic economy. While the shape of any yield curve is a function of numerous fiscal and monetary factors, perceptions play a very important role in shaping the empirical yield curves. Using pure expectations theory, explain the upward sloping, inverted and flat yield curves.

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

8. A moving average is a summary measure of price movement. Technical analysts observe moving averages more for 'crossovers' (price chart over moving average or vice versa) than for the changes in directions and obtain buy-sell signals. Discuss the important principles useful in this regard.

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

END OF SECTION C

END OF QUESTION PAPER

Suggested Answers

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Section A : Basic Concepts

1. Answer : (c) [< TOP >](#)
Reason : According to Bond value theorems ,
For a given difference between YTM and Coupon rate , high variations in the bond prices will occur with respect to longer maturity and decrease in YTM. As coupon rate is equal to YTM, both bonds are selling at their par value i.e. Rs.100.
If YTM changes to 9% then price of the bonds X and Y
For bond X
Market value at YTM 12%= 9 PVIFA(8%,5) + 100 PVIF(8%,5)
= Rs.103.9
For bond Y
Market value at YTM 12%= 9 PVIFA(8%,6) + 100 PVIF(8%,6)
= Rs.104.5
Clearly prices of bond X and Y have increased but price of bond Y has increased more than X.

2. Answer : (a) [< TOP >](#)
Reason : $\sigma_P^2 = W_A^2 \sigma_B^2 + W_B^2 \sigma_A^2 + 2W_A W_B \rho_{AB} \sigma_A \sigma_B$
 $115 = (0.6)^2 \times 324 + (0.4)^2 \times 196 + 2 \times 0.6 \times 0.4 \times \rho_{12} \times 18 \times 14$
 $115 = 116.64 + 31.36 + 120.96 \rho_{AB}$
 $\rho_{AB} = (115-148)/120.96 = -0.2728$
Coefficient of determination = $(0.2728)^2 = 0.0744$

3. Answer : (c) [< TOP >](#)
Reason : It is given that Market value to the Book value is equal to the Industry average.
Which means the firm is having a good Market value per share.
Also, ROE of the 'firm' is less than ROE of the Industry. Which implies that firm is having a low net
income because $ROE = \frac{PAT}{AverageEquity}$ having a good market price per share and low earnings
implies good $\frac{P}{E}$ ratio.
No information regarding the Leverage ratios can be gathered. Hence, the option (b) is incorrect.
Profitability of the firm is low as earnings are less. Hence option (a) is not correct.
No information regarding the Efficient utilization of assets can be gathered. Hence option (d) is incorrect.

4. Answer : (e) [< TOP >](#)
Reason : In a condition such that Required rate of return = ROE,
According to the Dividend discount model
 $P_0 = \frac{D_1}{K_e - g}$ Where the symbols are in standard use.

$$\frac{P_0}{E_0} = \frac{\frac{D_0}{E_0}(1+g)}{K_e - g} \quad \text{Where, } D_0/E_0 \text{ is the Dividend payout ratio}$$

$$= \frac{(1+g)(1-b)}{K_e - g} \quad \text{Where 'b' is the retention ratio}$$

Since $K_e = ROE$ and $g = ROE \times \text{Retention ratio}$

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

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

We get

$$\frac{P_0}{E_0} = \frac{1+g}{ROE}$$

Hence from the above derivations we can conclude that

when the growth rate increases, the market price of the share and the price earnings ratio will increase.

- The amount of earnings retained by the firm does not affect market price or the P/E.

And

- The P/E ratio is inversely proportional to the ROE of the firm.

Since all the given statements are true the option (e) is the correct answer.

5. Answer : (d)

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Reason : During the periods of inflation the prices of all materials will rise.

In a FIFO method the pricing will be based on the cost of material that was obtained first.

Adopting a FIFO will cause higher closing inventory and lower cost of goods sold leading to higher reported income. Consequently higher income taxes are required to be paid. Hence option (d) is the answer.

Since lower cost of goods sold and higher ending inventory are observed the

Options (a) and (c) are incorrect. No information regarding sales can be extracted from the given information. So, option (b) is also incorrect.

6. Answer : (c)

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Reason : Conversion rate is 14 shares per bond

Market price per share is Rs.80

Conversion value = Rs.(80 × 14) = Rs.1120

Market price of the bond = Rs.1475

$$\therefore \text{Premium over conversion value} = \frac{355}{1120} \times 100 = 31.70\%$$

7. Answer : (d)

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Reason : Duration = $\frac{1}{\text{Dividend yield}}$

Where

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Current Market price}}$$

$$\text{Current market price} = \frac{D_1}{K_e - g} = \frac{1.5(1+0.08)}{0.15-0.08} = \text{Rs } 23.14$$

$$\therefore \text{Dividend yield} = \frac{1.5}{23.14} = 0.0648$$

$$\therefore \text{Duration} = \frac{1}{0.0648} = 15.4 \text{ years.}$$

8. Answer : (c)

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Reason : Interest rate elasticity can be defined as

$$\frac{\text{Percentage change in price for bond in period } t}{\text{Percentage change in yield to maturity for bond } i}$$

$$\text{Modified duration} = \frac{\text{Duration}}{1 + \text{YTM} / f}$$

$$\text{and Current yield} = \frac{\text{Coupon Income}}{\text{Current price of bond}}$$

Hence, (a), (b) and (d) are not correct. Convexity measures the sensitivity of duration to change in the interest rates. Therefore, (c) is the correct answer.

9. Answer : (b)

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Reason: The beta of the portfolio consisting of two securities given that money is allotted equally between the two assets = $0.85 \times 0.5 + 1.45 \times 0.5 = 1.15$

$$\text{The systematic risk of a portfolio} = \beta^2 \sigma_m^2$$

Substituting the values, we get

$$(1.15)^2 \times (18)^2 = 428.49(\%)^2. \text{ Hence the correct answer is (b)}$$

10. Answer : (c)

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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

$$\text{Margin} = 3.25 \times 1000 + 3 \times 0.65 \times 1000 = 3250 + 1950 = 5200$$

Hence the correct answer is (c).

11. Answer : (c)

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$$\text{Reason : Relative strength of the stock} = \frac{\text{Average of upclosing prices}}{\text{Average of downclosing prices}}$$

$$\frac{135.25 + 142.75 + 145.25}{3}$$

$$= 132.75$$

$$\frac{141.083}{132.75} = 1.0628$$

12. Answer : (c)

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$$\text{Reason : According to H-model } P_0 = \frac{D_0 [(1 + g_n) + H(g_a - g_n)]}{r - g_n}$$

$$= \frac{D_0 (1 + g_n)}{r - g_n} + \frac{D_0 H(g_a - g_n)}{r - g_n}$$

$$= \text{Value based on normal growth rate} + \text{Premium due to abnormal growth rate}$$

$$\frac{D_0 H(g_a - g_n)}{r - g_n} = \frac{2.00 \times 2.5 \times (0.10 - 0.05)}{0.12 - 0.05}$$

$$= \frac{5 \times 0.05}{0.07} = \text{Rs. } 3.57.$$

13. Answer : (d)

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Reason : The steeper the slope of the ex-ante SML, the more averse investors are in assuming additional risk. Those securities which plot above the ex-post SML are under priced whereas, overpriced securities plot below SML. Clearly (I), (III) and (IV) are correct, whereas (II) is not correct. Therefore, (d) is the answer

14. Answer : (e)

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Reason : Deep discount bond, zero coupon bond and a bond which pays a single cash flow will have duration equal to its maturity. This is because only one payment is made at the time of maturity and no cash flow will be available in intermediate periods.

15. Answer : (b)

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Reason : After a slow expansion over a period, sometimes both prices and volume work into an exponential rise. This is indicative of heavy off-loading by bulls and is called a speculative blow off and marks the end of the bull market. Price and volumes both fall sharply after this development. Termination of a bear market is often signaled by a selling climax. A selling climax occurs when prices fall for a considerable time at an accelerated pace and are accompanied by expanding volume. Clearly (b) is correct while (a), (c) and (d) are wrong. Hence (b) is the answer.

16. Answer : (c)

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

17. Answer : (d)

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Reason : Average duration of unemployment, average prime rate charged by banks and commercial and industrial loans outstanding are the lagging indicators as they do not have any forecasting abilities. Change in index of labor cost per unit of output is also lagging indicator but initial claims for

unemployment insurance can be used to forecast the future employment position and hence a leading indicator. Therefore, (d) is the answer.

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

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

19. Answer : (a) [< TOP >](#)

Reason : As per the Dividend Discount Model,

$$\frac{P_0}{E_0} = \frac{(1+g)(1-b)}{K_e - g} \quad \text{where symbols have been used in their standard notation.}$$

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 : (c) [< TOP >](#)

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

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

$$\text{Reason : } r_{Bm} = 0.4 + 0.75 r_m$$

$$r'_{Bm} = 0.4 + 0.75 r'_m$$

$$(r_{Bm} - r'_{Bm}) = 0.75 (r_m - r'_m) \\ = 0.75 \times 12.5 = 9.375$$

$$\text{Abnormal} = 8.45 - 9.375 = -0.925\%.$$

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

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

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

Reason : If the credit rating of an ordinary plain vanilla bond is downgraded, then the market price falls and as a result ytm rises. It may be noted that the change in credit rating in no way affect the indenture contract on bonds coupon rate.

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

Reason : The coupon paying bonds and preferred stocks which pay interest at fixed rate are facing higher interest rate risk. Zero coupon bonds of average maturity and short term treasury bonds face relatively less risk.

Though both of these are issued at discount and redeemed at face value or premium, treasury bills having shorter maturity will face less interest rate risk.

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

Reason : YTM is the rate of return at which the PV of all the cash flows would be equal to zero. Therefore, the statement I is correct.

Closer to maturity the duration of the bond becomes small and hence the sensitivity of the bond price to the change in the interest rate reduces

The bonds with a call feature can be called by the issuer at an early date i.e., the debt may be paid off early.

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

Reason : In an in-the-money call option the exercise price is less than the current market price i.e., the option is having a positive intrinsic value and the buyer would make profit if the option is exercised today (in the case of an American option) on the present value of profit (in case of a European option)

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

Reason : The buyer of the put option on stock gets the right to sell the share at the exercise price hence the writer has an obligation to buy share at the exercise price.

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

Reason : As per DDM

$$P_0 = \frac{D_0(1+g)}{k-g}$$

The underlying assumptions are:

- i. It assumes that each future dividend is $(1+g)$ times greater than prior dividend
- ii. The discount rate, $k >$ growth rate, g
- iii. The growth rate, g remains constant

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

Reason : The equation expressing the relationship between Market Price of the bond and YTM is as follows

$$P_0 = C_0 \times PVIFA_{(k, n)} + F \times PVIF_{(k, n)}$$

Substituting the given values in the equation, we get

$$P_0 = 40 \times PVIFA_{(5\%, 30)} + 1000 \times PVIF_{(5\%, 30)} \\ = 896.2$$

Therefore, the change in market price = $(846.28 - 847.88)/847.88 = -0.189\%$.

Hence the correct answer is (c).

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

Reason : a. is not correct as more than number of peaks and trough that touch a trend line greater its significance.

b. is not correct as it is not breadth but the length of the trend line which indicates whether a penetration is significant or not.

d. is not correct as penetration of steep trend line results in a corrective movement after which the previous trend continues.

e. is not correct as the peaks of rallies when penetrate the trend line that indicates shift in trend.

Section B: Problems

1. Intrinsic value of equity at the end of 5th year:

$$\frac{D_6}{k - g_n} = \frac{8 \times 0.3 \times 1.17^5 \times 1.08}{0.14 - 0.08} = \frac{5.683}{0.06} = \text{Rs.} 94.72$$

OPTION I : Exchange part B and warrant at the end of 3rd year.

Year	Cash flow	Total flow Rs.
1.	Interest of $100 \times 0.12 = \text{Rs.} 12$	12.00
2.	Interest = $50 \times 0.12 = \text{Rs.} 6$ Dividend = $8 \times 0.3 \times 1.17^2 = \text{Rs.} 3.29$	9.29
3.	Interest = $50 \times 0.12 = \text{Rs.} 6$ Dividend = $8 \times 0.3 \times 1.17^3 = \text{Rs.} 3.84$	9.84
4.	Dividend = $2 [8 \times 0.3 \times 1.17^4] = 9.00$	9.00
5.	Dividend = $2 [8 \times 0.3 \times 1.17^5] = 10.52$ Sale = $2 \times 94.72 = \text{Rs.} 189.44$	199.96

$$\begin{aligned} \text{Present value of the total cash flow} &= \frac{12}{1.20} + \frac{9.29}{(1.20)^2} + \frac{9.84}{(1.20)^3} + \frac{9}{(1.20)^4} + \frac{199.96}{(1.20)^5} \\ &= \text{Rs.} 106.84 \end{aligned}$$

OPTION II: Retain Part B and let the warrant lapse

Year		
1.	Interest = 12	12
2.	Interest of Rs.6 + Dividend of Rs.3.29	9.29
3.	Interest of Rs.6 + Dividend of Rs.3.84	9.84
4.	Interest of Rs.6 + Dividend of Rs.4.5	10.50
5.	Interest of Rs.6 + Dividend of Rs.5.26 + Redemption of Rs. 50 + Sale of share Rs.94.72	155.98

$$\frac{12}{1.20} + \frac{9.29}{(1.20)^2} + \frac{9.84}{(1.20)^3} + \frac{10.5}{(1.20)^4} + \frac{155.98}{(1.20)^5} = \text{Rs.} 89.88$$

As the intrinsic value of Bond I in Option I is more than FV of Rs.100, investment should be made in the bond and exchange part B and warrant at the end of third year.

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2. i. For short-period observation, A/D lines do not account for unchanged stocks.

Day	Issues traded	Advance (A)	Declines (D)	Net (A - D)	Cumulative A - D
1	199	70	125	-55	-55
2	199	80	118	-38	-93
3	199	125	69	56	-37
4	199	130	60	70	33
5	199	144	54	90	123
6	199	150	45	105	228
7	199	84	110	-26	202

- ii. Long-period A - D line:

For long run observations, the A – D line is drawn after considering the number of issues also whose prices

remain unaltered. The A – D line is drawn by cumulative the value of $\sqrt{\frac{A}{U} - \frac{D}{U}}$

where,

A = No. of issues whose prices are advancing

D = No. of issues whose prices are declining

U = No. of stocks whose prices remains unaltered.

Day	Issues traded	Advance	Declines	Unchanged	(2) (4) x 100 (5)	(3) (4) x 100 (6)	(5 – 6)	$\sqrt{7}$	Cumulative A – D
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	199	70	125	4	1750	3125	-1375	37.08	-37.08
2	199	80	118	1	8000	11800	-3800	61.64	-98.72
3	199	125	69	5	2500	1380	1120	33.47	-65.25
4	199	130	60	9	1444.4	666.67	777.78	27.89	-37.36
5	199	144	54	1	14400	5400	9000	94.87	57.51
6	199	150	45	4	3750	1125	2625	51.23	108.74
7	199	84	110	5	1680	2200	-520	22.8	85.94

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$$3. \quad P = \frac{60}{(1.04)} + \frac{60}{(1.05)^2} + \frac{60}{(1.056)^3} + \frac{1060}{(1.0610)^4}$$

$$P = 57.692 + 54.422 + 50.952 + 836.46$$

$$= \text{Rs.}999.52$$

YTM of the bond A

$$999.52 = \frac{60}{(1+k)^1} + \frac{60}{(1+K)^2} + \frac{60}{(1+K)^3} + \frac{1060}{(1+K)^4}$$

At K = 6%

LHS = 1000

Hence YTM is approximately 6%.

Duration of Bond A

Year	C.F	P.v. of C.F at 6%	Year x P.V. of C.F
1	60	56.6	56.6
2	60	53.4	106.8
3	60	50.38	151.1
4	1060	839.6	3358
		1000	3673

$$\text{Duration} = \frac{3673}{1000} = 3.673 \text{ years}$$

$$\text{Modified duration} = \frac{3.673}{1+.06} = 3.465 \text{ years}$$

For a 0.40% increase in YTM change in the price of the bond A

$$\frac{\Delta P}{P} = -3.465 \times 0.40$$

$$= -1.386\%$$

Price of the bond A will decrease by 1.386%.

Price of the bond B

$$P = \frac{80}{(1.04)^1} + \frac{80}{(1.05)^2} + \frac{80}{(1.056)^3} + \frac{80}{(1.061)^4} + \frac{1080}{(1.0675)^5}$$

$$= 76.923 + 72.562 + 67.936 + 63.129 + 779.08$$

$$= 1059.63$$

Yield to maturity of the bond B

$$1059.6 = \frac{80}{(1+k)^1} + \frac{80}{(1+k)^2} + \frac{80}{(1+k)^3} + \frac{80}{(1+k)^4} + \frac{1080}{(1+k)^5}$$

$$K = 6.56\%$$

Duration of the Bond B

Year	C.F	Present value of cash flow at (6.56%)	Year x PVCF
1	80	75.075	75.0751
2	80	70.453	140.907
3	80	66.116	198.348
4	80	62.046	248.184
5	1080	786.05	3930.27
		1059.7	4592.79

$$\text{Duration} = \frac{4592.79}{1059.7}$$

$$= 4.334 \text{ years}$$

$$\text{Modified duration} = \frac{4.334}{1 + 0.0656}$$

$$= 4.067 \text{ years}$$

Change in the price of the bond = -4.06727×0.40

= -1.6268%

Therefore, price of the bond B will decline by 1.6268%.

- b. Price of the bonds after one year

Bond A

$$\frac{60}{(1+k)^1} + \frac{60}{(1+K)^2} + \frac{1060}{(1+K)^3}$$

$$57.609 + 54.267 + 896.32 = \text{Rs.}1008.2$$

$$\text{One year holding period return on bond A} = \frac{1008.2 - 1000 + 60}{1000} = 6.82\%$$

Bond B

$$\frac{80}{(1+k)^1} + \frac{80}{(1+k)^2} + \frac{80}{(1+k)^3} + \frac{1080}{(1+k)^4}$$

$$= 76.812 + 72.355 + 67.647 + 847.44 = 1064.3$$

$$\text{One year holding period return} = \frac{1064.3 - 1059.7 + 80}{1059.7} = 7.98\%$$

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4.

Months (I)	Actual Return on stock (%) (II)	Return on Index (%) (III)	Expected return on Reddy's stock using characteristic line (IV)	Above normal return % (V) = (II) – (IV)
November, 2003			–	
December, 2003	7.984	6.897	9.899	-1.915
January, 2004	7.394	0.922	5.239	2.155
February, 2004	7.917	1.37	5.588	2.329
March, 2004	-12.8	-1.8	3.115	-15.87
April, 2004	28.15	5.505	8.814	19.34
May, 2004	17.12	2.174	6.216	10.9
June, 2004	9.744	3.404	7.175	2.569
July, 2004	-4.44	5.761	9.014	-13.45
August, 2004	13.94	4.669	8.162	5.775
Σ Above normal return =				11.83

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.

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5. The net operating income (NOI) for a month, for these properties is as under:

Property	Rental Value (Rs.)	Electricity Charges (Rs.)	Water Charges (Rs.)	Net operating Income (Rs.)	
				Per month	Per annum
A	8,000	760	300	9,060	108720
B	5,750	525	200	6,475	77700
C	3,175	415	165	3,755	45060

The calculation of capitalization rate is shown below:

Property	NOI per annum	Market Value (Rs.)	$\frac{(1)}{(3)} \times 100\%$ (3) = (2)
	(1)	(2)	
A	108720	1,500,000	7.248
B	77700	1,100,000	7.064
C	45060	650,000	6.932

$$\text{Therefore, average capitalization rate} = \frac{7.248 + 7.064 + 6.932}{3} = 7.081\%$$

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6. a. I. Using a value-weighted average approach :

The value of the market is

$$\begin{aligned} \text{Rs.10 x 100,000} &= 1,000,000 & \text{Rs.10 x 100,000} &= 1,000,000 \\ 20 \times 10,000 &= 200,000 & \text{Rs.20 x 10,000} &= 200,000 \\ 30 \times 200,000 &= 6,000,000 & \text{Rs.60 x 200,000} &= 12,000,000 \end{aligned}$$

$$40 \times 50,000 = \frac{2,000,000}{\text{Rs.}9,200,000} \quad \text{Rs.}40 \times 50,000 = \frac{2,000,000}{\text{Rs.}15,200,000}$$

Average value = Rs.9,200,000/360,000 = Rs.25.56

Rs.15,200,000/360,000 = 42.22

Percentage increase: Rs.14.56/Rs.25.56 = 65.18%

II. Using the price weighted approach. The average prices are

(Rs.10 + 20 + 30 + 40)/4 = Rs.25.00

(Rs.10 + 20 + 60 + 40)/4 = Rs.32.50

Percentage increase: Rs.7.5/Rs.25.00 = 30%

c. The new prices and percentage changes:

Value-weighted average:

Rs.10 x 100,000 = 1,000,000

40 x 10,000 = 400,000

30 x 200,000 = 6,000,000

40 x 50,000 = 2,000,000

Rs.9,400,000

Average price: Rs.9,400,000/360,000 = Rs.26.11

Percentage increase: Rs.0.55/Rs.25.56 = 2.15%

Arithmetic average: (Rs.10 + 40 + 30 + 40)/4 = Rs.30

Percentage increase: Rs.5/Rs.25 = 20%

The market value-weighted average places emphasis on the number of shares outstanding while the equal weighted price average is unaffected by the number of shares.

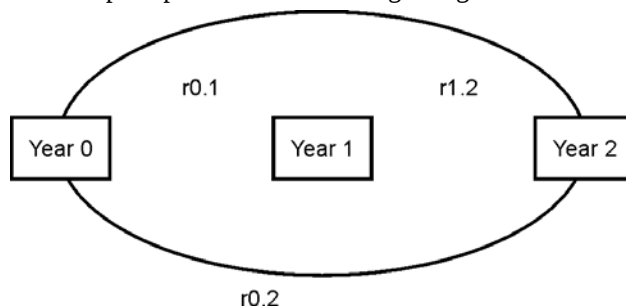
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Section C: Applied Theory

7. Low interest rates and a flat yield curve both are vital to the growth of domestic economy. While the shape of any yield curve is a function of numerous fiscal and monetary factors. Perceptions play a very important role in shaping the empirical yield curves.

Pure Expectations Theory tries to explain the phenomena regarding the existence of different shapes of yield curves.

According to Pure Expectations Theory, the current term structure of interest rates are determined by the consensus forecast of future interest rates. This can be understood by considering the following hypothesis through which we can understand how the perceptions of investors regarding the interest rates shape the yield curve.



At time 0 there is short term interest rate $r_{0,1}$ for money borrowed in year 0 and repayable in year 1. There is also a long term interest rate $r_{0,2}$ for money borrowed in year 0 and repayment in year 2. Linking these two rates is an unobservable “forward” that is expected to prevail in year 1 for money to be borrowed then for repayment in year 2. In terms of this forward rate, one can write the arbitrage condition as

$$(1 + r_{0,2})^2 = (1+r_{0,1}) (1+r_{1,2})$$

This says the total money (principal plus interest) repaid in year 2 should be the same whether the money is borrowed long-term at $r_{0,2}$ or borrowed short-term at $r_{0,1}$ and then “rolled-over” in year 1 at the then prevailing short-term rate $r_{1,2}$. The same condition holds for the investor also. The arbitrage condition says that the investor must be indifferent between these two alternatives.

Here we try to explain the shaping of yield curve with respect to the above theory by considering the following example of three different situations.

If one year interest rate is 15% ($r_{0,1} = 15\%$) but

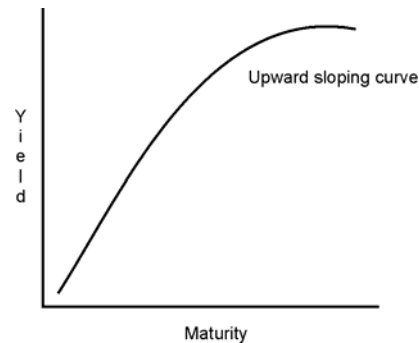
- (i) is expected to go up to 20% ($r_{1,2} = 20\%$) at the end of one year
- (ii) is expected to fall down to 10% ($r_{1,2} = 10\%$)
- (iii) is expected to be the same.

Hence considering the first situation

$$(i) \quad (1+r_{0,2})^2 = (1+0.15)(1+0.20) \rightarrow (r_{0,2}) = 17.5\%$$

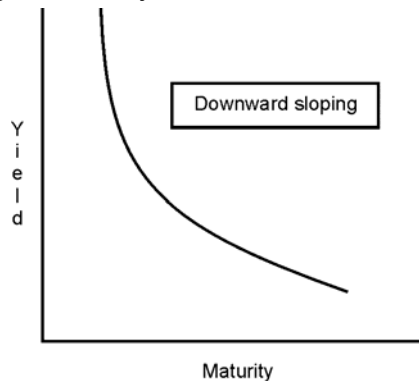
That is, an investor will opt for one year security now only when he is certain that the interest rate after one year is greater than the interest rate on two year security.

An upward sloping Yield curve according to this theory indicates that the investors expects that the interest rates going to rise.

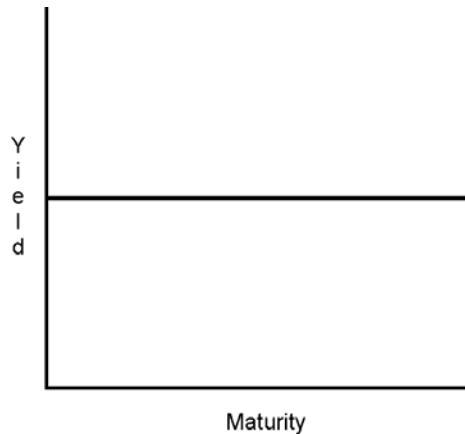


$$(ii) \quad (1+r_{0,2})^2 = (1+0.15)(1+0.10) \rightarrow (r_{0,2}) = 12.5\%$$

When interest rate on one year security is going to decline after one year, he will opt for two year instrument. A downward sloping curve according to this theory indicates that the investors expect a fall in interest rates.



- (iii) A flat yield curve indicates that investors expect that the interest rates remain at the same level.



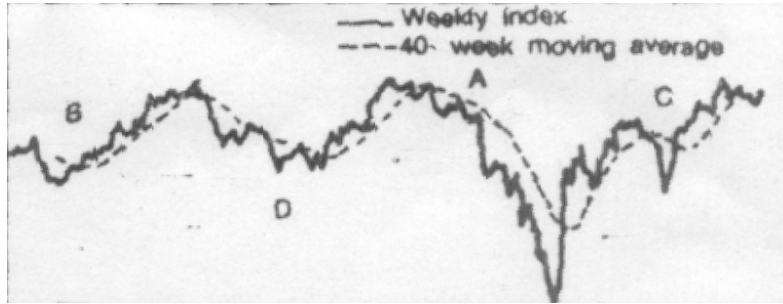
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8. The following are the important principles useful while observing crossover of moving average line over price line:
 - i. When the moving average rise above the price line, a reversal in bullish trend is signaled. This is based on the simple logic that as long as price at the end of a period is above the average that prevailed in the immediate past, prices are on an up trend. The converse is true for confirming the end of a bear market. The price line in that case would crossover the moving average. (See points A and B in figure below.)
 - ii. The price line moving average crossover has to be examined cautiously when the price line and moving average move in opposite directions before the crossover. The price line that falls below a rising moving average only indicates a secondary reaction and need not signal a trend reversal. Similarly, a price line that rises above a falling moving average is an indication to sell. (See point C in figure below.)
 - iii. A moving average represents a smoothened trend and therefore, also acts as a support/resistance line. A declining price line and rallies without crossing the line. Similarly, a rally in a bear market meets resistance at the moving average, and turns down.
 - iv. If the moving average is flat or has already begun to change direction, a crossover by the price line is a fairly reliable indicator of trend reversal.
 - v. The significance of a crossover signal depends, to a large extent, on the time span covered by a moving average. A moving average covering a long-term trend, and its crossover is more significant than a crossover of an average of shorter time span.

Some technicians use more than one moving average to smoothen the same price trend. This procedure smoothen the data twice, and provides warning signals for trend reversals, comparatively more quickly after they have taken place. It is common for analysts to use 100-day and 300-day averages simultaneously.

When the 100-day average moves below the declining 300-day average, a trend reversal is signaled. Multiple moving averages are useful because shorter-span averages reach the turning points earlier than the longer-span averages, and are very useful in confirming a trend reversal.

A point of caution is in order. Simple moving averages always invariably provide signals to buy or sell, after the trend reversal has begun. They are neither lead indicators, nor juncture points for change in trends. Simple moving averages, therefore, should only be used along with other indicators. In an accumulation/distribution phase, a series of crossovers can occur whether the market is moving sideways, and provide misleading signals.



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