

Question Paper

Portfolio Management and Mutual Funds - I (251) : January 2007

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 statements is **not true** with respect to the various methods of computing VAR? [< Answer >](#)

- (a) Stress Testing involves comparison of the value of a portfolio of assets under various market assumptions
- (b) Monte Carlo Simulation Method is used to generate a large number of market movements which is consistent with expected volatility and correlations
- (c) Historic Simulation Method is based on the assumptions about the distribution of returns and stability of the volatilities and correlations
- (d) In Historic Simulation Method, the use of the number of trading days for collecting data may not be a representative of future market movements
- (e) Variance/Covariance Method is also termed as correlation method.

2. The standard deviation of returns of a portfolio of two stocks will be the weighted average of the standard deviation of returns of the stocks, if [< Answer >](#)

- (a) The coefficient of correlation between two stocks is zero
- (b) The coefficient of correlation between two stocks is -1
- (c) The coefficient of correlation between two stocks is $+1$
- (d) The coefficient of correlation between two stocks is 0.5
- (e) The coefficient of correlation between two stocks is -0.5 .

3. The following is the information pertaining to the portfolio of Dolex Mutual Fund: [< Answer >](#)

Stock	No. of shares	Current Market Price (Rs.)
L&T	110,000	2,685.45
Cipla	312,000	259.95
Wipro	450,000	523.10
HDFC	390,000	883.30
Tata Steel	299,000	502.75

The fund has not borrowed any funds, but its accrued management fee with the portfolio manager currently totals Rs.3,000,000. The number of units outstanding is 107,573,000. The NAV of each unit is

- (a) Rs.10.02
- (b) Rs.10.15
- (c) Rs.10.26
- (d) Rs.10.31
- (e) Rs.10.45.

4. An investor can construct a portfolio that lies to the left of the optimal risky portfolio on asset allocation line by

[< Answer >](#)

- I. Borrowing at the risk-free rate and investing in the optimal risky portfolio.
- II. Lending some money at the risk-free rate and investing the remainder in the optimal risky portfolio.
- III. Investing only in risk free security.

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

5. The objective of an investor is to limit his portfolio risk to $289(\%)^2$. The return on gilt-edged securities is 6%. If the market portfolio is generating a return of 15.8% and its standard deviation is 20%, using the separation theorem, expected return on the portfolio is to be

[< Answer >](#)

- (a) 6.21%
- (b) 12.30%
- (c) 14.33%
- (d) 19.50%
- (e) 21.40%.

6. Which of the following risks is **not** considered by Burmeister, Ibbotson, Roll and Ross (BIRR) macro economic factor model?

[< Answer >](#)

- (a) Confidence risk
- (b) Time horizon risk
- (c) Currency risk
- (d) Business cycle risk
- (e) Market timing risk.

7. Consider the following information in relation to three stocks A, B and C:

[< Answer >](#)

Stock	Realized Return (%)	Beta
A	18	1.25
B	15	1.10
C	9	0.20

A portfolio consists of three stocks A, B and C in equal proportions. During the same period, the market index generated a return of 12.5%. Assuming that the risk free rate is 6.5%, the excess return generated by the portfolio is

- (a) 1.74%
- (b) 2.40%
- (c) 2.85%
- (d) 3.46%
- (e) 4.10%.

8. Which of the following is/are to be considered while implementing a contingent immunization strategy?

[< Answer >](#)

- I. Establishment of a well defined immunized available initial target return and leaving the determination of ongoing return to the circumstances prevailing.
- II. Identification of a suitable and immunizable safety net.
- III. Implementation of an effective monitoring procedure to ensure that the safety net return is not violated.

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

9. Which of the following strategies in the equity portfolio management can be referred to as asset allocation strategy? [< Answer >](#)
- (a) Theme Selection
 - (b) Market Timing Strategy
 - (c) Buy and Hold Strategy
 - (d) Stock Selection Strategy
 - (e) Indexing Strategy.
10. Goldman Sachs Asset Management (GSAM) factor model uses nine factors, which are categorized into three measures-value, growth and momentum & risk. Which of the following factors represent growth and momentum measure? [< Answer >](#)
- (a) Book value per share/Price
 - (b) Retained EPS/Price
 - (c) Estimate revisions
 - (d) Beta
 - (e) Disappointment risk.
11. For stock A, the residual variance of returns is $56(\%)^2$ and its beta is 1.23. If the variance of the market's return is $62(\%)^2$, the coefficient of correlation of stock A's return with that of market is approximately [< Answer >](#)
- (a) 0.50
 - (b) 0.79
 - (c) 0.84
 - (d) 0.89
 - (e) 0.92.
12. Bond laddering involves buying bonds of different [< Answer >](#)
- (a) Prices
 - (b) Durations
 - (c) Convexities
 - (d) Coupons
 - (e) Maturities.
13. Which of the following bonds has the lowest duration? [< Answer >](#)
- (a) A bond with a coupon payment @ 9% per annum and 11 year term to maturity
 - (b) A bond with a coupon payment @ 11% per annum and 9 year term to maturity
 - (c) A bond with a coupon payment @ 9% per annum and 13 year term to maturity
 - (d) A bond with a coupon payment @ 10% per annum and 13 year term to maturity
 - (e) A bond with a coupon payment @ 10% per annum and 11 year term to maturity.
14. Mr.Uday is considering an investment in a mutual fund with a 2.5% load. As another alternative, he can also invest in a bank deposit paying 8% interest. His investment-planning period is 3 years. What should be the annual rate of return on mutual fund so that he prefers the investment in the fund to the investment in bank deposit? [< Answer >](#)
- (a) 8.915%
 - (b) 9.365%
 - (c) 9.862%
 - (d) 10.124%
 - (e) 10.265%.

15. Nifty futures with an expiry date of January 25, 2007 is presently quoted at 3840. The multiple of each contract is 200. If the initial margin calculated by VAR at 99% confidence level is Rs.75110.4, the daily volatility in the futures price is

[< Answer >](#)

- (a) 1.95%
- (b) 2.14%
- (c) 2.91%
- (d) 3.26%
- (e) 4.12%.

16. An insurance company has the following obligations towards its customers.

[< Answer >](#)

At the end of the year	Obligations (Rs.)
2	10,00,000
4	15,00,000
8	20,00,000

If the yield curve is flat at 8% and company wants to immunize its obligations with the investment in a zero coupon bond, it must purchase the zero coupon bond with the maturity of

- (a) 7.4215 years
- (b) 6.8945 years
- (c) 5.9678 years
- (d) 4.8576 years
- (e) 3.4568 years.

17. The portfolio rebalancing should ensure that

[< Answer >](#)

- (a) The systematic risk remains constant
- (b) The unsystematic risk remains at unity
- (c) The systematic risk remains at unity
- (d) The systematic risk remains at zero
- (e) The total risk does not exceed unity.

18. A bond paying 7% coupon rate with quarterly payments currently sell at par value. If coupon is paid annually instead of quarterly and the bond has to sell at par, coupon rate on the bonds is to be

[< Answer >](#)

- (a) 7.186%
- (b) 7.286%
- (c) 7.386%
- (d) 7.486%
- (e) 7.586%.

19. Which of the following statements is/are **not true** with respect to constant mix strategies?

[< Answer >](#)

- I. These strategies are more static in nature.
- II. The risk tolerance level of the investors varies with the level of their wealth.
- III. When the stock markets are perfectly capable of reversing themselves such reversals favor the constant mix strategies over the buy and hold strategies.

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

20. Alpha of stock of Cipla Ltd. is – 2.8%. Beta of the stock is 0.68. Standard deviation of returns on market is 34.25%. If residual standard deviation of the stock is 15.46%, which of the following statements is/are **true**? [< Answer >](#)

- I. Standard deviation of returns on the stock of Cipla Ltd. is 38.75%.
- II. Coefficient of determination is 0.64.
- III. Systematic risk of stock is 342.43 (%)².

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

21. Which of the following statements is **not true**? [< Answer >](#)

- (a) Strategic asset allocation provides an important set of benchmarks for an investor
- (b) Tactical asset allocation provides the investors long run or average level of risk tolerance
- (c) Strategic asset allocation indicates an optimal asset mix to be held under normal conditions
- (d) Insured asset allocation seeks more to suit long-term investors objectives
- (e) Tactical asset allocation is sometimes based on assumption that the markets overreact to the available information.

22. Which of the following characteristics should be possessed by a reliable return factor model? [< Answer >](#)

- I. The correlation of the non-factor related return with the values of the factor should be very low.
- II. Major part of the total return should not be factor related.
- III. Returns from one security in the portfolio should not show any significant correlation with the return from another security in the same portfolio.

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

23. The following is the information pertaining to probabilities associated with the different economic scenarios and the probabilities for the returns on the stock of Ranbaxy. [< Answer >](#)

Economic Scenario	Probability of Economic Scenario	Performance of Stock	Probability of Stock's performance in given economic scenario
Prosperity	0.3	Good	0.6
		Average	0.3
		Poor	0.1
Normal	0.5	Good	0.4
		Average	0.3
		Poor	0.3
Recession	0.2	Good	0.2
		Average	0.3
		Poor	0.5

The probability that the economy will be normal and the stock will experience poor performance is

- (a) 0.03
- (b) 0.09
- (c) 0.12
- (d) 0.15
- (e) 0.20.

24. Expected cash flows from a portfolio at the end of the year will be either Rs.56,000 or Rs.1,56,000 with equal probabilities. The investment in T-bills pays 6% p.a. If your required risk premium is 9%, the amount you will be willing to pay today for the portfolio would be [< Answer >](#)
- (a) Rs.72,568.96
 - (b) Rs.79,586.78
 - (c) Rs.83,962.45
 - (d) Rs.88,752.12
 - (e) Rs.92,173.91.
25. Which of the following is/are the reason(s) which make(s) the SML a band instead of a thin line? [< Answer >](#)
- I. Transaction costs.
 - II. Imperfect information.
 - III. Taxes.
 - IV. Number of stocks in the market index.
- (a) Only (I) above
 - (b) Only (III) above
 - (c) Both (II) and (III) above
 - (d) (I), (II) and (III) above
 - (e) (I), (III) and (IV) above.
26. The current price of ACC's stock is Rs.1,010 and it is expected that price of the stock may either go up to Rs.1,212 or go down to Rs.808. If strike price of call option of ACC's stock is Rs.1,010 and risk-free rate is 6.5%, the probability of decrease in stock price is [< Answer >](#)
- (a) 0.7250
 - (b) 0.6625
 - (c) 0.5230
 - (d) 0.4680
 - (e) 0.3375.
27. Which of the following statements is/are **not true** with respect to Behavioral Asset Pricing Model (BAPM)? [< Answer >](#)
- I. Information traders are those who fall in the standard CAPM.
 - II. Noise traders are less prone to committing cognitive errors.
 - III. Noise traders have strict mean variance preference.
- (a) Only (I) above
 - (b) Only (III) above
 - (c) Both (I) and (II) above
 - (d) Both (I) and (III) above
 - (e) Both (II) and (III) above.
28. The spread between Treasury bill yields and Corporate bond yields widens when [< Answer >](#)
- I. Interest rates are low.
 - II. There is economic uncertainty.
 - III. There is a flight from quality.
- (a) Only (I) above
 - (b) Only (II) above
 - (c) Only (III) above
 - (d) Both (I) and (II) above
 - (e) Both (II) and (III) above.

29. Which of the following measures indicates the percentage of the variance in the portfolio's returns that is explained by the market's returns? [< Answer >](#)

- (a) Coefficient of determination
- (b) Coefficient of correlation
- (c) Standard deviation
- (d) Variance
- (e) Alpha.

30. Which of the following statements is **not true** with respect to investment strategies? [< Answer >](#)

- (a) Investment management process involves two steps, information process and implementation process
- (b) Information process deals with the selection of stocks
- (c) Information motive arises out of the need to increase or decrease the equity exposure
- (d) Volume of stock trading and frequency of trading are vital for determining the expected cost of liquidity for the appropriate size
- (e) As information is liable to be spread across the market rapidly, it loses value soon.

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. Mr. Rudra, the portfolio manager of Dolphin Mutual Fund, is managing an equity fund. The monthly returns on the fund, the market and the T-bills during the last 12 months are as follows. [< Answer >](#)

Period	Return on Dolphin Mutual Fund (R_d) %	Market Return (R_m) %	Return on 91 day T-Bill (R_t) %
Jan 06	3.77	6.37	0.74
Feb 06	9.07	4.13	0.52
Mar 06	4.48	3.13	0.94
Apr 06	3.29	9.09	0.47
May 06	-5.79	-8.86	0.64
Jun 06	6.95	11.86	0.73
Jul 06	1.66	6.95	0.58
Aug 06	7.57	5.80	0.95
Sep 06	5.97	2.45	0.46
Oct 06	1.27	10.66	0.70
Nov 06	0.87	4.56	0.59
Dec 06	-11.82	-13.68	0.56

You are **required** to observe whether the market timing ability of Mr. Rudra is superior or not.

(10 marks)

2. Mr. Sukesh has Rs.50 lakh to invest. He is planning to follow the constant rupee value plan to invest his money – with the total amount available divided equally between an aggressive stock [< Answer >](#)

portfolio and a conservative bond portfolio. He chose a stock, which is currently trading at Rs.520 for his aggressive portfolio. He wants to restore the relative proportions of the aggressive and conservative portfolio to their original levels each time the stock price changes by 15% or more. After his investment, changes in the price of the stock are as follows.

Day	Price (Rs.)	Day	Price (Rs.)
0	520	7	614
1	545	8	550
2	572	9	521
3	598	10	486
4	612	11	440
5	653	12	426
6	688	13	410

You are **required** to:

- Determine the value of the portfolio and revaluation action, if any, for each of the above prices.
- Show whether the formula plan followed by the investor is better than a passive buy-and-hold strategy.

(8 + 1 = 9 marks)

- Mr. Sunil is trying to construct an optimal portfolio with a target return of 17% p.a. from the three stocks namely Asian Paints, Britannia and CMC. Market return is 15% p.a. and market risk is 16% p.a. The market data pertaining to these stocks is given as under:

[< Answer >](#)

Stock	β	α (%)	$\sigma_{e_i}^2 (\%)^2$
Asian Paints	1.1	2.6	22.5
Britannia	0.9	1.8	32.5
CMC	1.2	0.9	25.6
Market	1.0		

Using langrarian model, you are **required** to calculate the proportions of funds to be invested in each of the three securities by Mr. Sunil so as to generate target return with the least possible risk. 91 day T-Bills are currently trading at the price of Rs.98.72.

(12 marks)

- Mr. Prakash, a pensioner will receive Rs.24,000 once in a year for a period of 15 years, the first receipt of which will commence from the end of the 5th year from today. The pension fund is planning to invest in 7 year and 15 year zero coupon bonds to immunize its position towards the payment of pension to Mr. Prakash. Currently the cost of such liabilities in the market is 11% p.a. You are **required** to determine the amount to be placed by the pension fund in each of the bonds to immunize the pension fund obligations to Mr. Prakash.

[< Answer >](#)

(9 marks)

- Mr. Ajay, the pension fund manager, is considering three mutual fund schemes i.e., stock fund, long-term government and corporate bond fund and T-Bill money market fund. The probabilities associated with the returns on stock fund and long-term government and corporate bond fund are as follows:

[< Answer >](#)

Probability	Return on Stock fund (%)	Return on long-term Government and corporate bond fund (%)

0.10	4	2
0.20	15	17
0.25	25	30
0.15	40	25
0.20	30	13
0.10	12	6

The yield on T-Bill fund is expected to be 6% p.a.

You are **required** to:

- Determine the minimum-variance portfolio of the two risky funds, its expected return and standard deviation.
- Compute the return and risk of the optimal risky portfolio, if the reward to variability ratio is maximum when the proportions of investment in each of the risky funds are 0.71 and 0.29 respectively. Also compute the reward to variability ratio of the optimal risky portfolio.

(6 + 4 = 10 marks)

END OF SECTION B

Section C : Applied Theory (20 Marks)

- This section consists of questions with serial number 7 - 9.
- Answer **all** questions.
- Marks are indicated against each question.
- Do not spend more than 25 -30 minutes on section C.

6. Ideally every investment targets a goal. The goal may be either tangible or intangible. It varies from individual to individual and it also varies at different stages of life for the same individual. Discuss different types of goals of individuals.

[< Answer >](#)

(10 marks)

7. Credit risk in bond portfolio management is defined as the risk of the non-payment of principal and interest, downgrading and widening of credit swap. Credit derivative is one of the useful tools to diversify or acquire credit risk. Explain various credit derivatives generally used in fixed income portfolio management.

[< Answer >](#)

(10 marks)

END OF SECTION C

END OF QUESTION PAPER

Suggested Answers

Portfolio Management and Mutual Funds - I (251) : January 2007

Section A : Basic Concepts

1. Answer : (c) [< TOP >](#)
Reason: Historic Simulation Method does not make any assumptions about the distribution of returns and stability of the volatilities and correlations. All other statements are correct.

2. Answer : (c) [< TOP >](#)
Reason : If coefficient of correlation between two stock's return A and B is +1 and W_A and W_B is the amount invested in a portfolio of these two stocks. Portfolio risk will be

$$\sigma_p^2 = W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2(+1) W_A W_B \sigma_A \sigma_B$$

$$\sigma_p^2 = (W_A \sigma_A + W_B \sigma_B)^2$$

$$\sigma_p = W_A \sigma_A + W_B \sigma_B$$
 Hence answer is (c).

3. Answer : (c) [< TOP >](#)
Reason : Value of the portfolio = $1,10,000 \times 2,685.45 + 3,12,000 \times 259.95 + 4,50,000 \times 523.10 + 3,90,000 \times 883.30 + 2,99,000 \times 502.75 = \text{Rs.} 1,106,708,150$
 $= \text{Rs.} 1,106,708,150 - \text{Rs.} 3,000,000 = \text{Rs.} 1,103,708,150$
 $\text{NAV} = \text{Rs.} 1,103,708,150 / 107,573,000 = \text{Rs.} 10.26$

4. Answer : (d) [< TOP >](#)
Reason : By lending some money at the risk-free-rate and investing remainder in the optimal risky portfolio an investor can form the portfolio which lies left to the risky portfolio on asset allocation. Investing only in risk-free assets will ensure that portfolio will lie on Y axis and hence both (II) and (III) are correct.

5. Answer : (c) [< TOP >](#)
Reason : Targeted risk $\sigma_i^2 = 289(\%)^2$

$$\sigma_i = 17\%$$
 According to separation theorem

$$\sigma_i^2 = (1 - wf)^2 \sigma_m^2$$

$$\sigma_i = (1 - wf) \sigma_m$$

$$wf = 1 - \frac{\sigma_i}{\sigma_m}$$

$$= 1 - \frac{17.00}{20.00}$$

$$wf = 0.15$$

$$E(r_i) = w_f r_f + (1 - w_f) r_m$$

$$= 0.15 \times 6 + 0.85 \times 15.8 = 14.33\%.$$

6. Answer : (c) [< TOP >](#)
Reason : The various risks considered by Burmeister, Ibbotson, Roll and Ross macro economic factor model (BIRR model) are confidence risk, time horizon risk, inflation risk, business cycle risk and market timing risk. Currency risk is not considered.

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

Reason : Realized return on the portfolio = $(18+15+9)/3 = 14\%$
 Portfolio beta = $(1.25 + 1.10 + 0.20)/3 = 0.85$
 Expected return on the portfolio = $R_f + \beta_p(R_m - R_f) = 6.5 + 0.85(12.5 - 6.5) = 11.6\%$
 Excess return = $14 - 11.6 = 2.4\%$

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

Reason : The following are the considerations to be kept in mind while implementing a contingent immunization strategy.

- Establishment of a well defined immunized available target return both initial and ongoing.
- Identification of a suitable and immunizable safety net.
- Implementation of an effective monitoring procedure to ensure that the safety net return is not violated.

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

Reason : Theme selection strategy involves overweighting specific industries or sectors versus others that are underweighted. This strategy do not involve drastic change in the asset allocation. Buy and hold strategy requires static allocation of fund. Stock selection strategy focuses on selecting good stock and do not emphasize on changing the asset allocation. Indexing strategy does not require frequent change in the asset allocation. Therefore (a), (c) (d) and (e) are wrong. Timing the market strategy involves shifting of funds from one asset class to another to enhance the portfolio performance and therefore the correct choice is (b).

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

Reason : Goldman Sachs Asset Management factor model uses the following three measures.

- Value
- Growth and momentum
- Risk

The factors used in this model are

Value	Growth and Momentum	Risk
i. Book/Price	i. Estimate revisions	i. Beta
ii. Retained EPS/Price	ii. Price momentum	ii. Residual risk
iii. EBITD/Enterprise value	iii. Sustainable growth	iii. Disappointment risk

Book/Price, retained EPS/Price are the value measures. Hence, (a) and (b) are not correct. Beta and disappointment risk are risk measures and therefore (d) and (e) are also not correct.

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

Reason : $r^2 = \frac{\beta^2 \sigma_m^2}{\beta^2 \sigma_m^2 + \sigma_{e_i}^2} = \frac{(1.23)^2 \times 62}{(1.23)^2 \times 62 + 56} = \frac{93.7998}{149.7998} = 0.6262$
 $r = 0.7913 \approx 0.79$

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

Reason : Bond laddering involves buying bonds of different maturities.

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

Reason : A bonds' duration is lower when the coupon rate is higher and its duration decreases with decrease in time to maturity. Therefore, bond (b) with the highest coupon rate and lowest term to maturity will have the lowest duration.

14. Answer : (a)

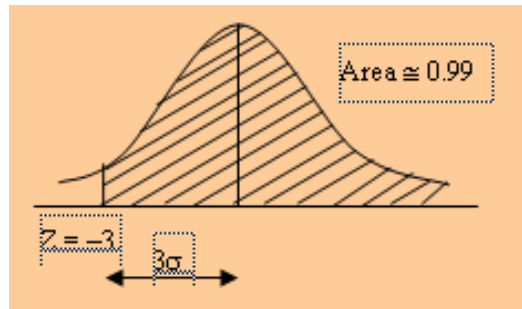
[< TOP >](#)

Reason: $0.975 \times (1+r)^3 > 1.08^3$
 $0.975 \times (1+r)^3 > 1.259712$
 $(1+r)^3 > 1.292$
 $(1+r) > 1.089152979$
 $r = 0.08915297877 = 8.915\%$.

15. Answer : (d)

[< TOP >](#)

Reason :



Hence, VAR at 99% confidence level $= 3\sigma$

in Rupee terms $VAR = 3840 \times 200 \times \frac{3\sigma}{100} = 75110.4$

$3\sigma = 9.78\%$

$\sigma = 3.26\%$

16. Answer : (d)

[< TOP >](#)

Reason : An insurance company must make payments to its customers of Rs.10,00,000 at the end of 2nd year, Rs.15,00,000 at the end of 4th year and Rs.20,00,000 at the end of 8th year. If the yield curve is flat at 8%, and company wants to immunize its obligations with a single issue of a zero coupon bond, it must purchase the zero coupon bond with the maturity of

Years		PVIF @ 8%	
2	10,00,000	8,57,338.82	17,14,677.64
4	15,00,000	11,02,544.78	44,10,179.12
8	20,00,000	10,80,537.77	86,44,302.16
		30,40,421.37	1,47,69,158.92

Duration of liabilities $= 1,47,69,158.92 / 30,40,421.37 = 4.8576$ years.

Since, company wants to immunize using a single zero coupon bond, maturity of the bond should also be 4.8576 years.

17. Answer : (a)

[< TOP >](#)

Reason : The portfolio balancing should always ensure that systematic risk of portfolio remains constant.

18. Answer : (a)

[< TOP >](#)

Reason : Effective rate if payment is made quarterly $= (1+0.07/4)^4 = 7.186\%$
Copoun payment should be 7.186%, if payment is made annually.

19. Answer : (a)

[< TOP >](#)

Reason : Constant mix strategies are more dynamic in nature. The risk tolerance level of the investors varies proportionately with the level of their wealth. When the stock markets are perfectly capable of reversing themselves such reversals favor the constant mix strategies over the buy and hold strategies.

20. Answer : (a) [< TOP >](#)
Reason : Alpha of stock of Cipla Ltd. – 2.8%. Beta of the stock is 0.68. Standard deviation of returns on market is 34.25%. If residual standard deviation of the stock is 15.46%,
Systematic risk of stock = $0.68^2 \times 34.25^2 = 542.4241(\%)^2 = 23.29 \%$
Total risk = $23.29 + 15.46 = 38.75\%$
Proportion of systematic risk out of total risk (Coefficient of determination) = $23.29/38.75^2 = 0.36$
21. Answer : (b) [< TOP >](#)
Reason : Strategic (not tactical) asset allocation provides the investors long run or average level of risk tolerance. All other statements are true and hence, alternative (b) is answer.
22. Answer : (d) [< TOP >](#)
Reason : A reliable factor model should possess the three characteristics. (I) Correlation of the non-factor related return with values of the factor should be very low. (II) Most of the return of a portfolio should be factor related. (III) The returns from one security in the portfolio should not show any significant correlation with the return from another security in the same portfolio. Clearly, statements (I) and (III) are correct but (II) is false.
23. Answer : (d) [< TOP >](#)
Reason : The probability of economy being in normal stage is 0.5 and the probability that the stock experiences poor performance is 0.3. The probability with which both the conditions will prevail simultaneously 0.15.
24. Answer : (e) [< TOP >](#)
Reason : Expected cash flows from a portfolio at the end of the year will be either Rs.56,000 or Rs.1,56,000 with equal probabilities. The alternative risk free investment in T-bills pays 6% p.a. If your required risk premium is 9%, the amount you will be willing to pay for the portfolio would be
 $56,000 \times 0.5 + 1,56,000 \times 0.5 = \text{Rs.}1,06,000$
The required rate of return = $6 + 9 = 15\%$
The amount to be paid today = $\text{Rs.}1,06,000/1.15 = \text{Rs.}92,173.91$.
25. Answer : (d) [< TOP >](#)
Reason : Imperfections present in the market such as transaction costs, taxes, and imperfect information makes SML a band instead of a thin line. Number of stocks in market index does not matter.
26. Answer : (e) [< TOP >](#)
Reason :

$$u = \frac{1212}{1010} = 1.2$$

$$d = \frac{808}{1010} = 0.80$$

$$\text{Probability of price increase} = \frac{R - d}{u - d}$$

$$= \frac{(1.065) - 0.8}{1.20 - 0.8} = 0.6625$$
Probability of price decrease = $1 - 0.6625 = 0.3375$.
27. Answer : (e) [< TOP >](#)
Reason : Information traders are those who fall in the standard CAPM. Noise traders are more prone to committing cognitive errors and do not have strict mean variance preference. Hence, statements (II) and (III) are false and alternative (e) is answer.

28. Answer : (b) [< TOP >](#)
Reason : Economic uncertainty increases the chances of default and therefore widens the spread between Treasury and Corporate bond yields.
29. Answer : (a) [< TOP >](#)
Reason : Portfolio alpha is a measure of the excess return generated on the portfolio. Standard deviation and variance are measures of total risk of the portfolio. Coefficient of correlation is a measure of the comovement in the returns on the securities constituting the portfolio or of the comovement between the return on market index and the return on the portfolio. Coefficient of determination (r^2) is a measure of the variance in the portfolio's return that is explained by the market's return.
30. Answer : (c) [< TOP >](#)
Reason : Investment management process involves two steps information process and implementation process.
Information process deals with the selection of stocks.
Cashflow motive not information motive arises out of the need to increase or decrease the equity exposure.
Volume of stock trading and frequency of trading are vital for determining the expected cost of liquidity for the appropriate size.
As information is liable to be spread across the market rapidly, it loses value soon.
Hence, alternative (c) is answer.

Section B : Problems

1. Market timing ability of the portfolio manager can be estimated by estimating the following equation. [< TOP >](#)

$$(R_{it} - R_{ft}) = a_i + b_i (R_{mt} - R_{ft}) + c_i (R_{mt} - R_{ft})^2 + e_i$$
Where,
 R_{it} = Return on fund i in period t
 R_{mt} = Return on market index in period t
 R_{ft} = Return on risk less assets
 e_i = Residual return
If the value of the 'c' parameter of the quadratic term is positive, it indicates the superior performance of that fund can be attributed to skills of fund manager in timing the market.

Period	Return on Dolphin (R_d)	Market Return (R_m)	Return on T-Bill (R_t)
Jan 06	3.77	6.37	0.74
Feb 06	9.07	4.13	0.52
Mar 06	4.48	3.13	0.94
Apr 06	3.29	9.09	0.47
May 06	-5.79	-8.86	0.64
Jun 06	6.95	11.86	0.73
Jul 06	1.66	6.95	0.58
Aug 06	7.57	5.80	0.95
Sep 06	5.97	2.45	0.46
Oct 06	1.27	10.66	0.70
Nov 06	0.87	4.56	0.59
Dec 06	-11.82	-13.68	0.56

Period	$(R_m - R_t)$	$(R_m - R_t)^2$	$(R_d - R_t)$	$(R_m - R_t)(R_d - R_t)$	$(R_m - R_t)^2(R_d - R_t)$	$(R_m - R_t)^2$	$[(R_m - R_t)^2]^2$	$(R_m - R_t)(R_m - R_t)^2$
	X_1	X_2	Y	$X_1 Y$	$X_2 Y$	X_1^2	X_2^2	$X_1 X_2$
Jan 06	5.63	31.70	3.03	17.06	96.05	31.70	1004.89	178.47
Feb 06	3.61	13.03	8.55	30.87	111.41	13.03	169.78	47.04
Mar 06	2.19	4.80	3.54	7.75	16.99	4.80	23.04	10.51
Apr 06	8.62	74.30	2.82	24.31	209.53	74.30	5520.49	640.47
May 06	-9.50	90.25	-6.43	61.09	-580.31	90.25	8145.06	-857.38
Jun 06	11.13	123.88	6.22	69.23	770.53	123.88	15346.25	1378.78
Jul 06	6.37	40.58	1.08	6.88	43.83	40.58	1646.74	258.49
Aug 06	4.85	23.52	6.62	32.11	155.70	23.52	553.19	114.07
Sep 06	1.99	3.96	5.51	10.97	21.82	3.96	15.68	7.88
Oct 06	9.96	99.20	0.57	5.68	56.54	99.20	9840.64	988.03
Nov 06	3.97	15.76	0.28	1.11	4.41	15.76	248.38	62.57
Dec 06	-14.24	202.78	-12.38	176.29	-2510.42	202.78	41119.73	-2887.59
Total	34.58	723.76	19.41	443.35	-1603.92	723.76	83633.87	-58.66

So, the coefficients a, b, and c can be found from following equations

$$\sum y = na + b \sum x_1 + c \sum x_2 \quad \dots(i)$$

$$\sum yx_1 = a \sum x_1 + b \sum x_1^2 + c \sum x_1 x_2 \quad \dots(ii)$$

$$\sum yx_2 = a \sum x_2 + b \sum x_1 x_2 + c \sum x_2^2 \quad \dots(iii)$$

$$\sum y = 19.41, \quad \sum x_1 = 34.58 \quad \sum x_2 = 723.76$$

$$19.41 = 12a + 34.58b + 723.76c \quad \dots(i)$$

$$\sum yx_1 = 443.35; \quad \sum x_1^2 = 723.76; \quad \sum x_1 x_2 = -58.66$$

$$443.35 = 34.58a + 723.76b - 58.66c \quad \dots(ii)$$

$$\sum yx_2 = -1603.92; \quad \sum x_1 x_2 = -58.66 \quad \sum x_2^2 = 83633.87$$

$$-1603.92 = 723.76a - 58.66b + 83633.87c \quad \dots(iii)$$

By (i) $\times 34.58 -$ (ii) $\times 12$; we get

$$\begin{array}{rclcl} 414.96a & + & 1195.78b & + & 25027.62c & = & 671.2 \\ 414.96a & + & 8685.12b & - & 703.92c & = & 5320.2 \\ \hline & & -7489.34b & + & 25731.54c & = & -4649 \end{array} \quad \dots(iv)$$

By (ii) $\times 723.76 -$ (iii) $\times 34.58$; we get

$$\begin{array}{rclcl} 25027.62a & + & 523828.54b & - & 42455.76c & = & 320879 \\ 25027.62a & - & 2028.46b & + & 2892059.23c & = & -55463.55 \\ \hline & & 525857b & - & 2934514.99c & = & 376342.55 \end{array} \quad \dots(v)$$

Now (iv) $\times 525857 -$ (v) $\times -7489.34$; we get

$$-3938321864b + 13531110430c = -2444709193$$

$$3938321864b - 21977580500c = 2818557313$$

$$c = \frac{373848120}{8446470070} = -0.0443 \sim -0.044$$

From (iv) we get

$$b = \frac{3509.09}{7489.34} = 0.4685 \sim 0.47$$

From (i) we get

$$19.4 = 12a + 34.58 \times 0.4685 + 723.76 \times -0.0443$$

$$a = 2.94$$

So the value of the regression coefficients are

$$a = 2.94; \quad b = 0.47; \quad c = -0.044$$

$$Y = 2.94 + 0.47X_1 - 0.044X_2$$

Since the value of c is negative, the market timing ability of the fund manager is not pervasive.

2.

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Day	Stock price (Rs.)	Buy & Hold (Rs. lakhs)	Conservative portfolio (Rs. lakhs)	Aggressive portfolio (Rs. lakhs)	Total (Rs. lakhs)	Revaluation action	Number of shares held
0	520	50.00	25.00	25.00	50.00	—	4808
1	545	52.40	25.00	26.20	51.20	—	4808
2	572	55.00	25.00	27.50	52.50	—	4808
3	598	57.50	25.00	28.75	53.75	Sell 314 shares at 598	4494
3	598	57.50	26.875	26.875	53.75	—	4494
4	612	58.85	26.875	27.504	54.379	—	4494
5	653	62.79	26.875	29.347	56.222	—	4494
6	688	66.15	26.875	30.920	57.795	Sell 294 shares at 688	4200
6	688	66.15	28.898	28.898	57.795	—	4200
7	614	59.04	28.898	25.790	54.688	—	4200
8	550	52.89	28.898	23.102	52.000	Buy 527 shares at 550	4727
8	550	52.89	26	26.000	52.000	—	4727
9	521	50.10	26	24.629	50.629	—	4727
10	486	46.73	26	22.975	48.975	—	4727
11	440	42.31	26	20.800	46.800	Buy 591 shares at 440	5318
11	440	42.31	23.4	23.400	46.800	—	5318
12	426	40.96	23.4	22.655	46.055	—	5318
13	410	39.42	23.4	21.805	45.205	—	5318

b. Under the buy and hold plan, there would have been a loss of Rs.10.58 lakh (that is 50.00 – 39.42) while the loss is just Rs.4.795 lakh under the constant rupee value plan.

3. Return on 91 day T-Bills = $(100 - 98.72) / 98.72 \times 365 / 91 \times 100 = 5.2\% \text{ p.a}$

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Expected return on the stocks = $\alpha + [R_f + \beta(R_m - R_f)]$

$$\text{Variance} = \beta^2 \sigma_m^2 + \sigma_e^2$$

Asian Paints

$$\text{Expected return} = 2.6 + [5.2 + 1.1 (15 - 5.2)] = 18.58\%$$

$$\text{Variance} = \beta_A^2 \sigma_m^2 + \sigma_{e_A}^2 = 1.1^2 \times 16^2 + 22.5 = 332.26(\%)^2$$

Britannia

$$\text{Expected return} = 1.8 + [5.2 + 0.9 (15 - 5.2)] = 15.82\%$$

$$\text{Variance} = \beta_B^2 \sigma_m^2 + \sigma_{e_B}^2 = 0.9^2 \times 16^2 + 32.5 = 239.86 (\%)^2$$

CMC

$$\text{Expected return} = 0.9 + [5.2 + 1.2 (15 - 5.2)] = 17.86\%$$

$$\text{Variance} = \beta_C^2 \sigma_m^2 + \sigma_{e_C}^2 = 1.2^2 \times 16^2 + 25.6 = 394.24 (\%)^2$$

$$\text{Covariance between Asian Paints and Britannia} = \beta_A \beta_B \sigma_m^2 = 1.1 \times 0.9 \times 16^2 = 253.44 (\%)^2$$

$$\text{Covariance between Britannia and CMC} = \beta_B \beta_C \sigma_m^2 = 0.9 \times 1.2 \times 16^2 = 276.48 (\%)^2$$

$$\text{Covariance between Asian Paints and CMC} = \beta_A \beta_C \sigma_m^2 = 1.1 \times 1.2 \times 16^2 = 337.92 (\%)^2$$

Stock	$\sigma_{e_i}^2 (\%)^2$	Alpha (%)	Variance-Covariance Matrix $(\%)^2$		
			Asian Paints	Britannia	CMC
Asian Paints	22.5	2.6	332.26	253.44	337.92
Britannia	32.5	1.8	253.44	239.86	276.48
CMC	25.6	0.9	337.92	276.48	394.24
Market		-			

Assume the proportion invested in Asian Paints, Britannia and CMC are X_A , X_B and X_C respectively.

Minimize (Total risk of portfolio)

$$Z = 332.26 X_A^2 + 239.86 X_B^2 + 394.24 X_C^2 + (2 \times 253.44 \times X_A X_B) + (2 \times 276.48 \times X_B X_C) + (2 \times 337.92 X_A X_C) \dots (I)$$

Subject to:

$$18.58X_A + 15.82X_B + 17.86X_C = 17 \dots (II)$$

$$X_A + X_B + X_C = 1 \dots (III)$$

We have to incorporate the return constraint (2) as part of the objective function (1) using the langrarian constraint λ . For this, first we express X_C in terms of X_A and X_B as $(1 - X_A - X_B)$, using constraint (3) in both the equations (1) and (2) and this replacement will transform the equation (1) into two variable equations.

$$Z = 332.26 X_A^2 + 239.86 X_B^2 + 394.24 (1 - X_A - X_B)^2 + (2 \times 253.44 \times X_A X_B) + 2 \times 276.48 X_B \times (1 - X_A - X_B) + 2 \times 337.92 X_A (1 - X_A - X_B)$$

$$= 332.26 X_A^2 + 239.86 X_B^2 + 394.24 (1 + X_A^2 + X_B^2 + 2X_A X_B - 2X_A - 2X_B) + 506.88 X_A X_B + 552.96 X_B - 552.96 X_B^2 - 552.96 X_A X_B + 675.84 X_A - 675.84 X_A X_B - 675.84 X_A^2$$

$$= 332.26 X_A^2 + 239.86 X_B^2 + 394.24 + 394.24 X_A^2 + 394.24 X_B^2 + 788.48 X_A X_B - 788.48 X_A - 788.48 X_B + 506.88 X_A X_B + 552.96 X_B - 552.96 X_B^2 - 552.96 X_A X_B + 675.84 X_A - 675.84 X_A X_B - 675.84 X_A^2$$

$$= 50.66 X_A^2 + 81.14 X_B^2 + 66.56 X_A X_B - 112.64 X_A - 235.52 X_B + 394.24 = 0$$

Expressing X_C in terms of X_A and X_B equation 2 above is modified as

$$18.58X_A + 15.82X_B + 17.86(1 - X_A - X_B) = 17$$

$$18.58X_A + 15.82X_B + 17.86 - 17.86X_A - 17.86X_B = 17$$

$$= 0.72X_A - 2.04X_B + 0.86 = 0 \dots (IV)$$

Using lagrangian multiplier, the revised objective function is

$$Z = 50.66 X_A^2 + 81.14 X_B^2 + 66.56 X_A X_B - 112.64 X_A - 235.52 X_B + 394.24 + \lambda (0.72X_A - 2.04X_B + 0.86)$$

$$= 50.66 X_A^2 + 81.14 X_B^2 + 66.56 X_A X_B - 112.64 X_A - 235.52 X_B + 394.24 + 0.72X_A \lambda - 2.04X_B \lambda + 0.86\lambda$$

Now for optimization setting first derivatives with respect to X_A , X_B & λ equal to zero we get

$$\frac{\partial Z}{\partial X_A} = 101.32X_A + 66.56 X_B - 112.64 + 0.72\lambda = 0 \dots (V)$$

$$\frac{\partial Z}{\partial X_B} = 162.28 X_B + 66.56 X_A - 235.52 - 2.04\lambda = 0 \dots (VI)$$

$$\frac{\partial Z}{\partial \lambda} = 0.72X_A - 2.04X_B + 0.86 = 0 \quad \dots(VII)$$

From (V) $\times 2.04$ we get $206.6928X_A + 135.7824X_B - 229.7856 + 1.4688\lambda$
 & (VI) $\times 0.72$ we get $47.9232X_A + 116.8416X_B - 169.5744 - 1.4688\lambda$
 On subtracting $254.616X_A + 252.624X_B = 399.36 \dots (VIII)$
 Taking (VII) and (VIII) we have:
 $= 0.72X_A - 2.04X_B = -0.86$
 $254.616X_A + 252.624X_B = 399.36$
 From (VII) $\times 254.616$ we get, $183.32352X_A - 519.41664X_B = -218.96979$
 & (VIII) $\times 0.72$ we get, $183.32352X_A + 181.88928X_B = 287.5392$
 $701.30592X_B = 506.50899$
 $X_B = 0.72 = 72\%$
 $0.72X_A - 2.04X_B = -0.86$
 $0.72X_A - 2.04 \times 0.72 = -0.86$
 $0.72X_A = 0.6088$
 $X_A = 0.8455 = 84.55\%$
 $X_A + X_B + X_C = 1$
 $X_C = 1 - 0.72 - 0.8455 = -0.5655$

$$R_p = 18.58 \times (0.8455) + 15.82 \times 0.72 + 17.86 \times -0.5655 = 17\%.$$

4. a.

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End of the year	Pension Payment (Rs.)	PVIF @ 11%	Present value of payments (Rs.)	Year $\times$ PV of payments (Rs.)
5	24,000	0.593	14,232	71,160
6	24,000	0.535	12,840	77,040
7	24,000	0.482	11,568	80,976
8	24,000	0.434	10,416	83,328
9	24,000	0.391	9,384	84,456
10	24,000	0.352	8,448	84,480
11	24,000	0.317	7,608	83,688
12	24,000	0.286	6,864	82,368
13	24,000	0.258	6,192	80,496
14	24,000	0.232	5,568	77,952
15	24,000	0.209	5,016	75,240
16	24,000	0.188	4,512	72,192
17	24,000	0.170	4,080	69,360
18	24,000	0.153	3,672	66,096
19	24,000	0.138	3,312	62,928
			1,13,712	11,51,760

$$\text{Duration} = 1151760 / 113712 = 10.13 \text{ years}$$

$$\text{PV of obligations} = \text{Rs. } 1,13,712$$

$$7W + 15(1-W) = 10.13$$

$$7W + 15 - 15W = 10.13$$

$$8W = 4.87$$

$$W = 4.87 / 8 = 0.60875$$

Investment to be made in 7 year zero coupon bond = Rs.1,13,712×0.60875 = Rs.69,222.18

Investment to be made in 15 year zero coupon bond = Rs.1,13,712× (1–0.60875) = Rs.44,489.82

5. a.

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Probability (P)	R _S (%)	R _B (%)	P × R _S	(R _S –E (R _S))	P(R _S –E (R _S)) ²	P × R _B	(R _B –E (R _B))	P(R _B –E (R _B)) ²	P(R _S –E (R _S)) (R _B –E (R _B))
0.1	4	2	0.4	-18.85	35.53225	0.2	-16.05	25.76025	30.25425
0.2	15	17	3	-7.85	12.3245	3.4	-1.05	0.2205	1.6485
0.25	25	30	6.25	2.15	1.155625	7.5	11.95	35.70063	6.423125
0.15	40	25	6	17.15	44.11838	3.75	6.95	7.245375	17.87888
0.2	30	13	6	7.15	10.2245	2.6	-5.05	5.1005	-7.2215
0.1	12	6	1.2	-10.85	11.77225	0.6	-12.05	14.52025	13.07425
			22.85		115.1275	18.05		88.5475	62.0575

Variance of returns on Stock fund = 115.1275 (%)²

Standard Deviation of returns on Stock fund = 10.73%

Variance of returns on Bond fund = 88.5475 (%)²

Standard Deviation of returns on Bond fund =9.41%

Covariance between Stock fund and Bond fund = 62.0575(%)²

$$\begin{aligned} \text{Minimum variance portfolio (W}_S\text{)} &= \frac{\sigma_B^2 - \text{Cov}_{SK}}{\sigma_S^2 - 2\text{Cov}_{SK} + \sigma_B^2} \\ &= \frac{88.5475 - 62.0575}{115.1275 - 2 \times 62.0575 + 88.5475} \\ &= 0.332956 \sim 0.333 \end{aligned}$$

Proportion of investment to be made in stock fund =0.333

Proportion of investment to be made in bond fund = 1–0.333 = 0.667

Expected return on minimum variance portfolio = 0.333 × 22.85 + 0.667 × 18.05 = 19.65%

Variance on minimum variance portfolio = 0.333² × 115.1275 + 0.667² × 88.5475

+ 2 × 0.333 × 0.667 × 62.0575 = 79.73 (%)²

Standard deviation on minimum variance portfolio = 8.93%

b. Expected return on optimal risky portfolio = 0.79 × 22.85 + 0.21 × 18.05 = 21.842%

Variance on optimal risky portfolio = 0.79² × 115.1275 + 0.21² × 88.5475

+ 2 × 0.79 × 0.21 × 62.0575 = 96.35 (%)²

Standard deviation on optimal risky variance portfolio = 9.82%

Reward to variability ratio = (21.842–6)/9.82 = 1.61324

Section C: Applied Theory

6. **Near-Term High Priority Goals:** Goals such as saving for improvement of one's own qualification or saving enough to pay the margin for a housing loan are generally very short-term priorities. The individual generally has a high emotional involvement with the achievement of such goals. The emotional involvement generally arises from the fact that, for people with modest resources, the cost of non-achievement of these goals is very high. They generally tend to invest the funds saved for these goals in highly safe and liquid investments.

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Long-Term High Priority Goals: The goals that fit into this category are generally like planning for the higher education of a child who is just born, planning to set up a charitable institution after retirement, or achieving financial independence a certain number of years down the line. The goals being long-term, investments are generally made in risky assets of long maturity. It is also common to hold a reasonably diversified portfolio.

Lower Priority Goals: In everyone's life, there are certain goals that one would like to achieve, but do not result

in any sort of hardship if they are not achieved. Consider, for example, goals like going on a tour to a foreign country, owning the trendiest color television in the world or owning a house in the wealthiest colony of the city. As these are likely to be beyond the reach of most people in the ordinary course of events, the funds that they save for these goals are generally invested in highly speculative investments. Investments such as these are often made for the fun and thrill of the process than seriously for achieving the goals. It is not uncommon to find investors who allocate a part of their savings to speculative investments.

Money Making Goals: There are some individuals who are not satisfied with the attainment of goals that are suitable to their economic level. They are always in continuous pursuit of avenues for acquiring substantial wealth. They are people with entrepreneurial bent of mind. Such individuals generally invest all they have into a single investment and monitor it carefully. Their risk tolerance is often very high. Therefore, they invest in upcoming companies and wait till the companies grow and then harvest their profits and move on to another company.

7. Credit risk in bond portfolio management is defined as the risk of the non-payment of principal and interest, downgrading and widening of credit swap. Downgrading risk is the risk of downgrading the instrument by the credit rating agencies. Return of the bond depends on the risk associated with it, a high rated bond gives lower return than a low rated bond. Credit spread risk is defined as an increase in the interest rate spread over a riskless bond like treasury bills due to purchase of risky bond. Credit derivative is one of the useful tools to diversify or acquire credit risk. Credit derivative is the negotiable financial instrument that is designed to transfer the credit risk of the assets or issuers between two or more parties. It may be in the form of an option, forward or swap where cash flows are linked with the credit characteristics of the bonds. Return from the credit derivative instrument may be the significant part of the portfolio return.

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CREDIT OPTION

Credit option is an instrument to protect against credit risk and is different from the standard debt option as the latter is designed to protect against interest rate risk. Credit option is of two types, one which is triggered by a decline in the value of assets and another which is triggered by a change in the asset's spread over a comparable risk-free rate.

There are two types of option writing on an underlying asset:

- Binary credit option with a predetermined pay-out
- Binary credit option based on credit rating.

In a binary credit option with a predetermined pay-out, the option seller has an obligation to pay-out a fixed sum in case of default, but in case of no default at the time of maturity, the option buyer will lose the premium. American binary option can be exercised anytime during its life whereas European binary credit option can be exercised at the time of maturity only.

Binary credit option based on credit rating is another type of option, which is exercised at the time when the credit rating falls below investment grade i.e., option buyer will get money if the credit agency downgrades the instrument below investment grade; otherwise, he will lose the premium. Thus, binary credit option deals with only two outcomes.

CREDIT FORWARD

Credit forward is a useful instrument for the buyer of the credit exposure and the portfolio manager who wishes to hedge the appreciated value of its portfolio. Like the credit option, credit forward may be contracted on bond value or credit spread. Portfolio managers can hedge their earnings by purchasing the credit forward. Increase in the high-yield credit spread results in increase in the value of credit forward while decreasing the portfolio yield.

CREDIT SWAPS

Credit swaps are also of two types like credit options — credit default swap and total return swap. The difference between the two is that the rationale of a credit default swap is to hedge the credit exposure by selling it to a credit protection seller like the credit option while the total return swap is used to increase credit exposure and assume more risk for more return. Credit insurance and swapping risky credit are the two types of credit default swap. In credit insurance, the buyer of the credit protection pays a fee to the seller of the credit protection in return for the right to receive a fixed amount in case of the default of a referenced credit. The buyer of the credit protection continues to receive the total return on the referenced assets until the total return is negative due to default, widening credit spread or downgrading. An alternative to the credit insurance type is the investor agreeing to swap the total return on credit risky assets for fixed periodical payment from the credit protection seller; the pay-off is

such that if the credit risk declines in value the investor will repay for the decline plus receive a periodical payment from the seller. This is referred to as swapping risky credit payments.

A total return credit swap is in fact used -to increase the credit exposure. It involves transferring of all of the economic exposure of the asset under consideration to the credit swap purchaser. It includes all cash flows that arise from the referenced assets and their capital appreciation or depreciation. The credit swap buyer pays a floating rate plus any depreciation of the referenced asset to the credit swap seller in return for the exposure assumed.

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