

**Question Paper**  
**Portfolio Management: Theory and Practice (MB3G2F) : January 2009**

**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. The uncertainty of the ability of the investor to exit from the investment when he desires is known as [<Answer>](#)
- (a) Business risk
  - (b) Financial risk
  - (c) Liquidity risk
  - (d) Political risk
  - (e) Credit risk.
2. According to Jack Treynor, value traders [<Answer>](#)
- I. Seek stock from the companies with sound financial statements.
  - II. Use time according to their convenience.
  - III. Are less sensitive to price as compared to 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.
3. Which of the following goals will be considered by the individuals who invest in upcoming companies and wait till the companies to grow and then harvest their profits and move on to other company? [<Answer>](#)
- (a) Short-term high priority goals
  - (b) Money making goals
  - (c) Long-term high priority goals
  - (d) Lower priority goals
  - (e) No goals.
4. Fund managers generally want which of following objectives to be optimal? [<Answer>](#)
- I. Stability of principle.
  - II. Income.
  - III. Growth of income.
  - IV. Capital appreciation.
- (a) Both (I) and (II) above
  - (b) Both (I) and (III) above
  - (c) Both (II) and (III) above
  - (d) Both (III) and (IV) above
  - (e) All (I), (II), (III) and (IV) above.
5. Which of the following statements is/are **false** with respect to Lead Indicator approach? [<Answer>](#)
- I. Lead Indicator approach attempts to forecast general economic conditions.
  - II. Leading indicators provide advance signals of turning points in economic activity.
  - III. This approach conveys the information regarding the magnitude and the duration of the change.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Only (III) above
  - (d) Both (I) and (III) above
  - (e) All (I), (II) and (III) above.

6. Which of the following approaches/methods ignores the financials and focuses on the psychology of individual? [<Answer>](#)
- (a) 100 minus your age method
  - (b) Risk tolerance method
  - (c) 100 common stocks for long run
  - (d) Cash flow needs method
  - (e) Financial objective method.
7. Which of the following statements is/are **true** with respect Capital Market Line (CML)? [<Answer>](#)
- I. It is the line passing from risk-free rate through market portfolio.
  - II. The slope of CML is called market price of risk.
  - III. CML fails to express equilibrium pricing relationship between expected return and standard deviation for all efficient portfolios lying along the line.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Only (III) above
  - (d) Both (I) and (II) above
  - (e) Both (I) and (III) above.
8. Which of the statements is/are **false** regarding Arbitrage Pricing Theory (APT)? [<Answer>](#)
- I. APT assumes that return on any asset can be expressed as a linear function of a set of market factors or indexes.
  - II. The arbitrage price line indicates relation between unsystematic risk and the expected return of an asset.
  - III. While deriving the APT model, APT assumes that the error term can be reduced to zero through appropriate diversification.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Only (III) above
  - (d) Both (I) and (II) above
  - (e) Both (I) and (III) above.
9. Which of the following statements is/are **true** with respect to the fair value of an index futures contract, if all the other things remain constant? [<Answer>](#)
- I. An increase in the risk free rate increases the fair value of the futures contract.
  - II. A decrease in the risk free rate increases the fair value of the futures contract.
  - III. A reduction in the dividend yield reduces the fair value of futures contract.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Only (III) above
  - (d) Both (I) and (III) above
  - (e) Both (II) and (III) above.
10. If the risk free rate of return ( $R_f$ ) is 7%, expected return on the market [ $E(R_m)$ ] is 15%, and the return on stock X is 16%, the beta for the stock X using CAPM is [<Answer>](#)
- (a) 0.85
  - (b) 1.00
  - (c) 1.14
  - (d) 1.26
  - (e) 1.33.

11. Which of the following statements is **false** with respect to stock index futures? [<Answer>](#)
- (a) Stock index futures are cash settled
  - (b) Any investor who has invested in stock index futures can offset his/her position only on the expiration day of the futures contract
  - (c) The performance of index futures' contracts are guaranteed by the exchange's clearing house
  - (d) The margin requirement is applicable to both the buyers and sellers of stock index futures
  - (e) When an investor is long on the stock index futures, he will receive a cash settlement on the expiration day, if the closing price exceeds the contract price.

12. Following information is available about various annual coupon paying bonds: [<Answer>](#)

Bond	Coupon (%)	Maturity (years)
A	7	10
B	8	10
C	7	11
D	6	12
E	5	13

The bond with longest duration will be

- (a) A
  - (b) B
  - (c) C
  - (d) D
  - (e) E.
13. Mr. Alok has collected the following historical data on the two shares which comprise his portfolio: [<Answer>](#)

Particulars	Falcon International	Triumph International
Average Return (%)	10	8
Average Volatility (%)	12	15

For the portfolio to yield lower risk than the individual stocks, the correlation coefficient of stocks should be

- (a) Less than 1.25
  - (b) Less than 0.85
  - (c) Less than 0.80
  - (d) More than 0.83
  - (e) Cannot be commented.
14. As per Life Cycle Model, in which of the following phase(s) an individual realizes that he has enough money not only for his survival but even for lavish living? [<Answer>](#)
- I. Accumulation phase.
  - II. Consolidation phase.
  - III. Spending phase.
  - IV. Gifting phase.
- (a) Only (I) above
  - (b) Only (III) above
  - (c) Only (IV) above
  - (d) Both (I) and (IV) above
  - (e) Both (II) and (IV) above.

15. Mr. Zaffar has following scrips in his portfolio: [<Answer>](#)

Scrip	Beta	Proportion of investment (%)
Reliance	0.83	0.25
Infosys	0.80	0.25
Reymond	1.40	0.35
IndiaBulls	1.20	0.15

If the risk free rate is 6% and return on the market is 16%, what will be the expected return on his portfolio?

- (a) 12.54%  
(b) 13.28%  
(c) 14.12%  
(d) 15.36%  
(e) 16.80%.
16. Which of the following statements is/are **not correct** with respect to the 'Constant Mix Strategies' of asset allocation? [<Answer>](#)
- I. Investors adopting these strategies tend to maintain an exposure to stocks that are in constant proportion of their wealth.  
II. The risk-tolerance level of the investors varies proportionately with the level of their wealth.  
III. Reversals in stock markets oppose constant mix strategies over the buy and hold strategies.
- (a) Only (I) above  
(b) Only (II) above  
(c) Only (III) above  
(d) Both (I) and (II) above  
(e) Both (II) and (III) above.

17. At the prevailing environment, the Capital Market Line (CML) equation for a portfolio  $i$  is given as [<Answer>](#)

$$E(r_i), \% = 8 + 0.36 \sigma_i$$

The ex-ante SML equation for the same portfolio  $i$  is

$$E(r_i), \% = 8 + 5.50 \beta_i$$

Therefore, the variance of market portfolio is approximately

- (a)  $30(\%)^2$   
(b)  $64(\%)^2$   
(c)  $126(\%)^2$   
(d)  $233(\%)^2$   
(e)  $244(\%)^2$ .
18. The portfolio of Mr. Bhaskar had a beginning value of Rs.100 lakhs and after a year an ending value of Rs.135 lakhs. If Mr. Bhaskar, receives Rs.12.5 lakhs at the end of 6 months as dividends, the Money Weighted Rate of Return (MWROR) of Mr. Bhaskar's portfolio is [<Answer>](#)
- (a) 12.5%  
(b) 14.0%  
(c) 16.5%  
(d) 18.5%  
(e) 21.3%.

19. The standard deviation of a portfolio of two stocks will be the weighted average of the standard deviation of the stocks if, [<Answer>](#)
- (a) The coefficient of correlation of two stocks is zero  
(b) The coefficient of correlation of two stocks is  $-1$   
(c) The coefficient of correlation of two stocks is  $+1$   
(d) The coefficient of correlation of two stocks is  $0.5$   
(e) The coefficient of correlation of two stocks is  $-0.5$ .

20. Which of the following statements is/are **true** with respect to feasible set of portfolio?

[<Answer>](#)

- I. Feasible set is also known as opportunity set.
- II. It represents all the portfolios that could be formed from group of N securities.
- III. Feasible set is also called efficient set.

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

21. Which of the following statements is/are **true** for formula plans?

[<Answer>](#)

- I. For effective implementation of constant dollar value plan, it is necessary to estimate the possibility and extent of downward fluctuation in the value of aggressive portfolio.
- II. One of the drawbacks of constant ratio plan is that it becomes less aggressive in buying stocks when the stock prices fall and less aggressive in selling stocks when the stock prices rise.
- III. In variable ratio plan, one should start the plan when the stock prices are at the end of bear phase.

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

22. An investor wants to invest Rs.20,00,000 in the following bonds as per the percentages specified:

[<Answer>](#)

Bond	Percent of money to be invested	Duration of the bond in years
1	12	10.45
2	45	4.55
3	25	8.35
4	8	13.00
5	10	7.00

The face value of each bond is Rs.1,000 and YTM is 10%. The duration of the bond portfolio is approximately

- (a) 7.13 years
- (b) 8.22 years
- (c) 9.23 years
- (d) 10.12 years
- (e) 11.00 years.

23. Which of the following factors is **not** used in Burmeister, Ibbotson, Roll and Ross (BIRR) model:

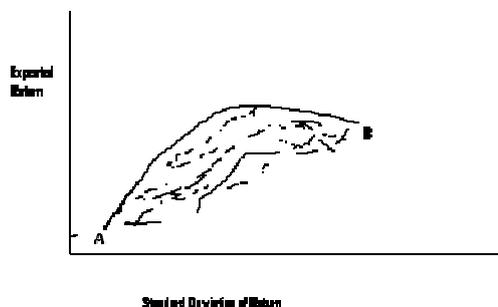
[<Answer>](#)

- (a) Investor confidence
- (b) Value of the currency
- (c) Interest rate risk
- (d) Real business activity
- (e) Market index.

24. Depending upon the investor's preferences and the market opportunities, an investor's portfolio is the portfolio that [<Answer>](#)
- I. Maximizes his/her expected utility.
  - II. Maximizes his/her risk.
  - III. Minimizes both his/her risk and return.
  - IV. Maximizes his/her expected profit.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Only (III) above
  - (d) Only (IV) above
  - (e) Both (I) and (III) above.
25. Which of the following statements is/are **false** with respect to yield enhancement strategy of portfolio strategies using index futures? [<Answer>](#)
- I. Yield enhancement strategy refers to portfolio strategy of holding a synthetic stock index fund.
  - II. In the absence of yield enhancement, synthetic securities cannot be useful for hedging a portfolio position which is quite difficult to hedge in the cash market either because of lack of liquidity or some imposed constraints.
  - III. Yield enhancement strategy provides better return on a portfolio by exploiting the mispricing of the futures.
- (a) Only (I) above
  - (b) Only (II) above
  - (c) Both (I) and (II) above
  - (d) Both (II) and (III) above
  - (e) All (I), (II) and (III) above.
26. Suppose, the current value of the Nifty is 6000 and the annualized dividend yield on the Nifty is 4%. The risk-free rate of interest is 7% per annum. Future contract is trading at a multiple of 50. Assuming 30% of stocks included in the Nifty will pay dividends during the three month period, the fair price of the three month futures contract is [<Answer>](#)
- (a) 4,420
  - (b) 4,670
  - (c) 4,990
  - (d) 6,054
  - (e) 7,226.
27. Which of the following approaches recommended by Edmand A Mennes for the selection and revision of equity portfolios, suggests that the portfolios can be structured by classifying stocks into industries, with weight of each industry in the market portfolio? [<Answer>](#)
- (a) First approach
  - (b) Second approach
  - (c) Third approach
  - (d) Fourth approach
  - (e) Fifth approach.
28. As per Security Market Line (SML), a security is considered aggressive, if its beta value is [<Answer>](#)
- (a) 0.2
  - (b) 0.5
  - (c) 0
  - (d) Lesser than 1
  - (e) Greater than 1.

29. Mr. Kiran wrote a European call option on a stock. The premium was Rs.5 per share and the market price and exercise price of the share were Rs.39 and Rs.45 respectively. If on expiry date, the price of the share was Rs.42, the profit/loss to Mr. Kiran was [<Answer>](#)
- (a) Rs.3  
 (b) -Rs.4  
 (c) -Rs.5  
 (d) Rs.4  
 (e) Rs.5.

30.



[<Answer>](#)

The above figure shows the trade-off between expected risk and return. Based on this figure, which of the following statements is/are **true** regarding asset mixes?

- I. The asset mixes lying below the curvilinear line AB are efficient asset mixes.  
 II. Efficient asset mixes are those which provide higher returns than other asset mixes for the same amount of risk.  
 III. There is no risk associated with efficient asset mixes.
- (a) Only (I) above  
 (b) Only (II) above  
 (c) Only (III) above  
 (d) Both (I) and (II) above  
 (e) Both (I) and (III) above.

**END OF SECTION A**

## Portfolio Management: Theory and Practice (MB3G2F) : January 2009

### Section B : Problems/Caselet (50 Marks)

- This section consists of questions with serial number 1 – 5.
- Answer all questions.
- Marks are indicated against each question.
- Detailed workings/explanations should form part of your answer.
- Do not spend more than 110 - 120 minutes on Section B.

1. The market value of investments held by an institution as on April 01, 2008 was Rs.600 crore. On December 31, 2008 the market value of the investments was Rs.1000 crore. The additional investments made during the nine month period (whose value is included in the value of investments as on December 31, 2008) and the income from the investments during the period are given below: [<Answer>](#)

End of month	Cash flow (Rs. crore)	Investment income (Rs. crore)	Market index
April	42	25	1480
May	50	23	1530
June	60	24	1620
July	45	22	1605
August	35	24	1580
September	34	25	1565
October	38	28	1630

**(10 marks)**

November	48	30	1605
December	0	31	1655

The dealing expenses amounted to 2% of the amount invested. The cash flow and investment income are invested at the end of the month in which they arise. The portfolio manager of the institution wants to beat the performance of an index whose values are given in the above table. The value of the index as on April 01, 2008 was 1500.

You are **required** to determine whether the fund manager outperformed the index or not.

2. Mr. Siva has Rs.24,00,000. He wants to invest his money in four bonds B1, B2, B3 and B4 each with par value of Rs.10,000 and YTM of 9%. The coupons of B1, B2, B3 and B4 payable annually are 4%, 8%, 12%, and 16% respectively. All the bonds mature in 5 years from now. The amount he is willing to invest in each bond is given below:

[<Answer>](#)

Bond	Amount (Rs.)
B1	9,00,000
B2	7,00,000
B3	5,00,000
B4	3,00,000

You are **required** to calculate:

- Duration of each bond. ( 9 marks)
  - Duration of a bond portfolio formed by combining all four bonds. ( 3 marks)
3. Consider the following information regarding the market capitalization of 12 companies in Indian market as on March 31st for the last 6 years. [<Answer>](#)

		(Rs. in crores)					
Firms	Years	2003	2004	2005	2006	2007	2008
1		146	152	164	175	185	201
2		1932	1981	2006	2126	2139	2235
3		320	335	348	361	372	412
4		2214	2236	2259	2363	2535	2633
5		456	469	472	488	494	498
6		1206	1269	1325	1386	1401	1425
7		1141	1152	1163	1175	1186	1193
8		316	328	336	349	363	389
9		439	448	457	478	485	496
10		1689	1735	1786	1799	1808	1825
11		2912	3002	3121	3152	3223	3301
12		362	378	386	393	406	451

(The companies with the market capitalization of less than Rs.500 crore are considered as small cap companies and with the market capitalization of more than Rs.1000 crore are considered as large cap companies.)

You are **required** to:

- Compute the return and risk of an equally weighted portfolio constructed using the securities of small cap firms. ( 6 marks)
- Compute the return and risk of an equally weighted portfolio constructed using the securities of large cap firms. ( 6 marks)

### Caselet

**Read the caselet carefully and answer the following questions:**

4. As mentioned in the caselet, owing to interest rate fluctuations, avoiding bond mutual funds and sticking to the traditional fixed-return and fixed period instruments may not be the right approach since investing in these instruments does not altogether immunize the portfolio from interest rate risks. In this context, [<Answer>](#) ( 8 marks)

explain the risks associated with these investments.

5. As discussed in the caselet, duration explains the sensitivity of net asset value of bond fund to the changes in interest rates. Owing to this, when bond fund manager anticipates interest rates to decline, he has to increase the duration of his bond portfolio and vice versa. In light of this, critically analyze how bond fund manager can make use of duration to maximize the return in anticipation of the change in interest rates.

[<Answer>](#)

**( 8 marks)**

While many factors, such as inflation expectations and supply and demand, will impact interest rates, it's important to understand the Fed's role as well. The Fed's Federal Open Market Committee, regulates short-term interest rates with the aim of promoting economic growth (and thus employment) and stable prices (or modest inflation). To achieve those goals, the FOMC has three levers that it can pull: open market operations, the discount rate, and setting bank reserve requirements. Recently, investors have witnessed open market operations, in a series of Fed-Funds rate cuts (most recently a dramatic 0.75% on Jan. 22 and 0.5% on Jan.30 drop to 3%), as well as cuts to the discount rate, designed to stabilize uncertain bond markets and keep the economy from slipping into recession. Each of these tools aids the Fed in regulating money supply and thus in either stimulating or reining in the economy.

What the Fed does impacts both stocks and bonds. For example, a declining Fed-Funds rate has traditionally been a boon for financials stocks, which often depend on short-term borrowing to finance business operations. Consumer stocks could also get a lift, too, because lower rates mean that customers are less pinched. But we need to keep in mind that interest rates aren't the only factor affecting stock prices. If the Fed's recent moves don't prevent a recession, consumer-focused stocks could get hurt. But the relationship between interest rates and bonds is more straightforward. Rising rates are bad for bonds; bond prices fall when interest rates go up. The opposite is true as well, which is why bonds typically rally when the Fed cuts rates. One way to gauge a fund's sensitivity to interest rates is by taking a look at its duration. If a fund has duration of 10 years, for instance, it means that the average price of a bond in its portfolio will either rise or fall roughly 10% for every 1 percentage point change in interest rates. When bond fund manager anticipates interest rates to decline, he has to increase the duration of his bond portfolio and vice versa. There's more to how interest-rate fluctuations impact returns. While the Fed has made some dramatic moves to try to revitalize the slowing economy, the actions of Fed change the interest rate structures in other economies like India, and this is the time for Indian investors should exercise caution in attempting to take advantage of these developments.

Investor might be tempted to pile into a fund that invests in long-term bonds, which are most sensitive to rate changes. But he needs to keep in mind that rates aren't the only thing that impacts the prices of bonds. A bond's credit worthiness can have a big effect, too. As a result, duration sensitivity is highest in Treasury issues (where there is effectively no credit risk) and can be much lower in the lower-quality region of the bond market. Many bond-fund managers will tweak their portfolios in an effort to get ahead of Fed rate change actions. But, getting interest-rate bets consistently correct and being able to adequately take advantage of those moves is extremely difficult. As a result, investors should pay as much attention to diversifying their bond-fund portfolios as they would to their stock-fund choices. By remaining diversified among a few bond-fund options, investors can be well positioned regardless of what direction interest rate changes take. If even the pros have a tough time figuring out where interest rates are headed in the short term and what effects they'll have in the future, his time is better spent finding investments that will likely do well over the long haul.

The recent fluctuations in interest rates have brought into sharper focus, for the retail investor in debt schemes of Indian mutual funds, their impact on the Net Asset Values (NAV) of these schemes. NAVs of mutual fund debt schemes have been effected and the market has taught investors the implication of interest-rate risk for their investments. Interest rate expectations and changes have exerted their

influence on short-term returns of investors in mutual fund debt schemes. Yet, the increased media attention and the significant increase in the number of investors in mutual fund schemes have added an entirely new dimension to this episode. Given this backdrop of interest rate fluctuations, there is a tendency for the investor to avoid mutual funds and stick to the traditional fixed-return, fixed period instruments such as fixed deposits, bank term deposits, government small savings schemes and bonds of financial institutions so as to insulate their portfolio from interest rate risks. However, that may not be the right approach since investing in fixed-return, fixed-period investments does not altogether immunize the portfolio from interest rate risks.

**END OF  
CASELET**

**END OF SECTION B**

### **Section C : Applied Theory (20 Marks)**

- This section consists of questions with serial number 6 - 7.
- Answer all questions.
- Marks are indicated against each question.
- Do not spend more than 25 -30 minutes on Section C.

6. Asset allocation should be dynamic as well as integrated. Depending on the process of asset allocation, there can be various approaches of asset allocation. Discuss the popular approach of asset allocation.

[<Answer>](#)

**( 10 marks)**

7. Passive management places less emphasis on expectations, that is, most of the key inputs are known at the time of investment analysis itself. Two widely used strategies of passive management are 'Buy-and-Hold and 'Indexing'. Under indexing strategy, a bond portfolio is formed with the objective of replicating the performance of selected index. Explain the advantages and disadvantages of indexing strategy.

[<Answer>](#)

**( 10 marks)**

**END OF SECTION C**

**END OF QUESTION PAPER**

## Suggested Answers

### Portfolio Management: Theory and Practice (MB3G2F) : January 2009

#### Section A : Basic Concepts

<b>Answer</b>	<b>Reason</b>	
1. C	The uncertainty of the ability of the investor to exit from the investment when he desires is known as liquidity risk.	<a href="#">&lt; TOP &gt;</a>
2. D	According to Jack Treynor value traders actively seek stocks from the companies with sound financial statements. They use time according to their convenience. So that by extending the time of trading, they can reduce cost of trading. Thus, they are less sensitive to time, as compared to price.	<a href="#">&lt; TOP &gt;</a>
3. B	Individuals who invest in upcoming companies and wait till the companies grow and then harvest their profits and move on to other company have money making goals.	<a href="#">&lt; TOP &gt;</a>
4. E	Fund managers may differ in their perceptions towards the set of portfolio objectives they would like to fix for a particular institution. However, many of them will find the following four distinct objectives to be optimal: I. Stability of principle. II. Income. III. Growth of income. IV. Capital appreciation.	<a href="#">&lt; TOP &gt;</a>
5. C	The leading indicator approach is valuable in indicating direction of change in economic activity. However, this method cannot provide any information on the magnitude and duration of the change. The lead indicator approach attempts to forecast the general economic conditions by identifying economic indicators that run ahead of the change in the general level of economic activity. Leading indicators provide advance signals of the turning points in the economic activity.	<a href="#">&lt; TOP &gt;</a>
6. B	Risk-tolerance method ignores the financials and focuses on the psychology of individual.	<a href="#">&lt; TOP &gt;</a>
7. D	CML is the line passing from risk-free rate through market portfolio. CML not only represents the new efficient frontier, but also expresses the equilibrium pricing relationship between $E(r)$ and $\sigma$ for all efficient portfolios lying along the line. The slope of CML is called market price of risk.	<a href="#">&lt; TOP &gt;</a>
8. B	APT assumes that return on any asset can be expressed as a linear function of a set of market factors or indexes. The arbitrage price line indicates relation between an assets systematic risk and the expected return. In deriving APT model deriving the APT model, an underlying assumption is that error term can be reduced to zero through appropriate diversification.	<a href="#">&lt; TOP &gt;</a>
9. A	The fair price of a futures contract is given by $F_0 = I_0 + I_0 \times R_f - I_0 D_t$ Where $I_0$ = Current value of market index $R_f$ = Risk-free rate $D_t$ = Dividend yield on the index. An increase in risk free rate will increase the fair value of the futures contract other things remaining constant. Similarly, a reduction in dividend yield will result into an increase in the fair price of the futures contract.	<a href="#">&lt; TOP &gt;</a>
10. C	$E(R) = R_f + \beta(R_m - R_f)$ $\Rightarrow 16 = 7 + \beta(15 - 7) \Rightarrow 8\beta = 9$ Therefore $\beta = 1.14$ .	<a href="#">&lt; TOP &gt;</a>

11. B • Stock index futures are settled in cash. [< TOP >](#)

Any investor can offset his /her position on any day before the expiration date of the futures contract.

Stock index futures contracts are guaranteed by the clearing house.

The margin requirements are applicable to both buyers and the sellers of the future contract and

If the closing price of the futures contracts exceeds the contract price there will be appreciation on the value of the futures contract and therefore the buyer of the contract will receive a cash amount equal to the difference between the contract price and the closing price.

12. E A bonds' duration is higher when the coupon rate is lower and its duration increases with increase in time to maturity. Therefore, bond E with the lowest coupon rate and highest term to maturity will have the longest duration. [< TOP >](#)
13. C For a portfolio of two security x + y the risk of the portfolio will be less than either of security taken alone if, [< TOP >](#)

Correlation coefficient between x and y  $r_{xy} < \frac{\sigma_x}{\sigma_y}$  Where  $\sigma_x < \sigma_y$

$$\text{Or } r_{xy} < \frac{12}{15} < 0.8$$

14. C When an individual realizes that he has enough not only for his survival but even for lavish living, he passes through a gifting phase. [< TOP >](#)

15. E [< TOP >](#)
- $$\beta_p = w_1\beta_1 + w_2\beta_2 + w_3\beta_3 + w_4\beta_4$$
- $$\beta_p = (0.83)(0.25) + (0.80)(0.25) + (0.35)(1.4) + (1.2)(0.15)$$
- $$\text{or } \beta_p = 1.0775$$
- $$R_p = R_f + \beta_p (R_m - R_f)$$
- $$\text{or } R_p = 0.06 + 1.0775(0.16 - 0.06) = 0.16775 \approx 16.80\%$$

16. C Constant mix strategies are more dynamic in nature. Investors adopting these strategies tend to maintain an exposure to stocks that is in constant proportion of their wealth. The risk-tolerance level of the investors varies proportionately the level of their wealth. It is found in the real world, that the stock markets are perfectly capable of reversing themselves and such reversals favor constant mix strategies over buy and hold strategy. [< TOP >](#)

17. D [< TOP >](#)
- Form of CML is  $E(R_i) = R_f + \left( \frac{R_m - R_f}{\sigma_m} \right) \sigma_i$
- & of ex-ante SML is  $E(R_i) = R_f + (R_m - R_f) \beta_i$

$$\text{Therefore, } \frac{R_m - R_f}{\sigma_m} = 0.36 \dots \dots (i)$$

$$(R_m - R_f) = 5.50$$

Substituting the value of  $R_m - R_f$  in ... (i)

$$\frac{5.50}{\sigma_m} = 0.36$$

$$\sigma_m = 0.36$$

From the above equations,  $\sigma_m^2 = (5.5/0.36)^2 = 233.4$  i.e., 233(%).<sup>2</sup>

18. E  $100(1+r) + 12.5(1+r)^{1/2} = 135$  [< TOP >](#)  
 At  $r = 21.3\%$ , L.H.S. = 135.07  
 Hence, MWROR = 21.3%.

19. C 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 [< TOP >](#)

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

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

$$\sigma_p = W_A \sigma_A + W_B \sigma_B$$

20. D A feasible set of portfolio is sometimes known as the opportunity set. A feasible set combines all portfolios that can be made possible by presenting N number of securities in different combinations. [< TOP >](#)

21. D For effective implementation of constant dollar value plan, it is necessary to estimate the possibility and extent of downward fluctuation in the value of aggressive portfolio. One of the drawbacks of constant ratio plan is that it becomes less aggressive in buying stocks when the stock prices fall and less aggressive in selling stocks when the stock prices rise. To achieve the result successfully under variable ratio plan one should start the plan when the stock prices are at a median value. [< TOP >](#)

22. A [< TOP >](#)

Bond (1)	Percent of money to be invested (2)	Duration of the bond in years (3)	(4) = (2) * (3)
1	0.12	10.45	1.254
2	0.45	4.55	2.0475
3	0.25	8.35	2.0875
4	0.08	13	1.04
5	0.1	7	0.7
			7.129

23. B In Burmeister, Ibbotson, Roll and Ross (BIRR) model following factors are used: [< TOP >](#)
- Investor confidence.

Interest rates.

Inflation.

Real business activity

Market index.

24. A Depending upon the investor's preferences and the market opportunities an investor's portfolio is the portfolio that maximizes her expected utility. Statements II & III are impossible. Statement IV is also not true because the related level of risk is important. Therefore, utility maximization is the right objective. [< TOP >](#)

25. B Yield enhancement strategy refers to portfolio strategy of holding a synthetic stock index fund. [< TOP >](#)

In this strategy, even in the absence of yield enhancement, synthetic securities can be useful for hedging a portfolio position which is quite difficult to hedge in the cash market either because of lack of liquidity or some imposed constraints.

Yield enhancement strategy provides better return on a portfolio by exploiting the mispricing of the futures.

26. D  $The\ fair(F_0) = 6000 + [(6000 \times 0.07 \times 0.30) - (6000 \times 0.04 \times 0.30)]$  [< TOP >](#)  
 $F_0 = 6000 + 126 - 72$   
 $F_0 = 6054$

27. D The fourth approach of Edmund A Mennis for the selection and revision of equity [<TOP>](#) portfolios suggests that the portfolios can be structured by classifying stocks into industries, with weight of each industry in the market portfolio. The rationale for structuring/restructuring portfolios by industries or economic sectors is based on the concept that the broad economic trends and movements in major sectors of the economy influence stock prices.
28. E The beta value of aggressive securities as per Security Market Line (SML) is greater [<TOP>](#) than 1
29. E Since the price of the share at expiry is Rs.42 the buyer of the option will not exercise [<TOP>](#) the option. Hence, the profit to Mr. Kiran is initial premium received i.e; Rs.5.
30. B The assets lying below the line are known as inefficient asset mixes, whereas the [<TOP>](#) assets lying on curvilinear line 'AB' are known as efficient asset mixes as these assets provide higher returns than other assets for the same amount of risk.

## Portfolio Management: Theory and Practice (MB3G2F) : January 2009

### Section B : Problems

1.

End of the month (1)	Cash flow (Rs.crore) (2)	Investment income (Rs.crore) (3)	Market index (4)	Total investment (Rs. Crore) (5)	Index value + 2% (6)	Additional units Purchased (Rs. Crore) (7) = (5)/(6)
April	42	25	1480	67	1509.6	0.0444
May	50	23	1530	73	1560.6	0.0468
June	60	24	1620	84	1652.4	0.0508
July	45	22	1605	67	1637.1	0.0409
August	35	24	1580	59	1611.6	0.0366
September	34	25	1565	59	1596.3	0.0370
October	38	28	1630	66	1662.6	0.0397
November	48	30	1605	78	1637.1	0.0476
December		31	1655	31	1688.1	0.0184
Total						0.3622

Total units held at the end of December =  $(600/1500) + 0.3622 = 0.7622$

Value of the units held at the end of December =  $0.7622 \times 1655 = \text{Rs.}1261.441\text{crore}$

Difference =  $1261.44 - 1000 = \text{Rs.}261.441\text{ crore}$ .

As the notional value of units of index bought is higher than the market value of the investments, it can be concluded that the fund manager under performed the index

2-Bond B1:

Time period (1)	Cash flow (2)	PV of cash flow @ 9% (3)	(4)	(5) = (1) * (4)
1	400	367.00	0.045	0.045
2	400	336.70	0.042	0.084
3	400	309.00	0.038	0.114
4	400	283.40	0.035	0.140
5	10400	6,759.30	0.840	4.200
		8,055.40		4.583

Bond B2:

Time period (1)	Cash flow (2)	PV of cash flow @ 9% (3)	(4)	(5) = (1) * (4)
1	800	733.94	0.076	0.076
2	800	663.34	0.070	0.140

3	800	617.74	0.064	0.192
4	800	566.74	0.060	0.240
5	10800	7019.26	0.730	3.675
		9601.02		Years 4.323

**Bond B3:**

Time period	Cash flow	PV of cash flow @ 9%		
(1)	(2)	(3)	(4)	(5) = (1) * (4)
1	1200	1100.92	0.098	0.098
2	1200	1010.01	0.090	0.180
3	1200	926.62	0.086	0.258
4	1200	850.11	0.076	0.304
5	11200	7279.23	0.650	3.250
		11166.89		Years 4.09

**Bond B4:**

Time period	Cash flow	PV of cash flow @ 9%		
(1)	(2)	(3)	(4)	(5) = (1) * (4)
1	1600	1467.88	0.115	0.115
2	1600	1346.68	0.106	0.212
3	1600	1235.49	0.097	0.291
4	1600	1133.48	0.089	0.356
5	11600	7539.20	0.593	2.965
		12722.73		Years 3.94

**b. Duration of a portfolio:**

Bond	Proportion of funds invested	Duration Years	D * W
A	0.375	4.583	0.172
B	0.292	4.323	1.262
C	0.208	4.090	0.851
D	0.125	3.940	0.492
			2.777 years

3. (The companies with the market capitalization of less than Rs.500 crore are considered as small cap companies and with the market capitalization of more than Rs.1000 crore are considered as large cap companies.)

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Small Cap Firms		Rs. in crore				
Years	2003	2004	2005	2006	2007	2008
Firms						
1	146	152	164	175	185	201
3	320	335	348	361	372	412
5	456	469	472	488	494	498
8	316	328	336	349	363	389
9	439	448	457	478	485	496
12	362	378	386	393	406	451

Large Cap Firms		Rs. in crore				
Years	2003	2004	2005	2006	2007	2008
Firms						
2	1932	1981	2006	2126	2139	2235
4	2214	2236	2259	2363	2535	2633
6	1206	1269	1325	1386	1401	1425
7	1141	1152	1163	1175	1186	1193
10	1689	1735	1786	1799	1808	1825
11	2912	3002	3121	3152	3223	3301

a.

Return on Small Cap Stocks and Small Cap Portfolio (%)									
Firms	1	3	5	8	9	12	Portfolio (R <sub>SCP</sub> )	(R <sub>SCP</sub> - $\bar{R}_{SCP}$ )	(R <sub>SCP</sub> - $\bar{R}_{SCP}$ ) <sup>2</sup>
Year									
2004	4.11	4.69	2.85	3.80	2.05	4.42	3.65	-0.50	0.2500
2005	7.89	3.88	0.64	2.44	2.01	2.12	3.16	-0.99	0.9801
2006	6.71	3.74	3.39	3.87	4.60	1.81	4.02	-0.13	0.0169
2007	5.71	3.05	1.23	4.01	1.46	3.31	3.13	-1.02	1.0404
2008	8.65	10.75	0.81	7.16	2.27	11.08	6.79	2.64	6.9696
							20.75		9.257

Average = 20.75/5 = 4.15%  $\therefore \sigma = \sqrt{\frac{(R_{SCP} - \bar{R}_{SCP})^2}{n-1}} = \sqrt{\frac{9.257}{4}} = 1.52\%$

b.

Return on Large Cap stocks and Large Cap Portfolio (%)									
Firms	2	4	6	7	10	11	Portfolio (R <sub>LCP</sub> )	(R <sub>LCP</sub> - $\bar{R}_{LCP}$ )	(R <sub>LCP</sub> - $\bar{R}_{LCP}$ ) <sup>2</sup>
Year									
2004	2.54	0.99	5.22	0.96	2.72	3.09	2.59	0.0980	0.0096
2005	1.26	1.03	4.41	0.95	2.94	3.96	2.43	-0.0620	0.0038
2006	5.98	4.60	4.60	1.03	0.73	0.99	2.99	0.4980	0.2480
2007	0.61	7.28	1.08	0.94	0.50	2.25	2.11	-0.3820	0.1459
2008	4.49	3.87	1.71	0.59	0.94	2.42	2.34	-0.1520	0.0231
							12.46		0.4304

Average = 12.46/5 = 2.492%  $\therefore \sigma = \sqrt{\frac{(R_{LCP} - \bar{R}_{LCP})^2}{n-1}} = \sqrt{\frac{0.4304}{4}} = 0.3280\%$

4. For an investor in fixed-income instruments, interest rate changes produce price and reinvestment risks. A change in the interest rate alters the price at which a fixed-income investment can be sold. For example, the increases in the interest rates would decrease the price at which investors can sell fixed-income investments. However, this does not apply to fixed-period investments held till maturity. But they are exposed to the other, reinvestment, risk. Fixed-period investments generate cash inflows such as interest and maturity receipts. These cash flows come at specified periods of time. The reinvestment of these cash flows can be made only at the prevailing interest rate. This rate is more often than not likely to be different from that at which investments were made. This is reinvestment risk.

For fixed-period investments, when the interest rate rises, the reinvestment risk works out to their benefit - reinvestment can be made for a rate higher than at the initial investment. Similarly, when interest rates decline, the funds can be considered to have been locked at a higher rate. Once again, this is only half the story. The reinvestment of cash flows can be made only at a lower rate. A lot of significance is attached to the reinvestment rate. It determines the realised yield on an investment. In short, changes in interest rates affect the realised yield on the fixed-period investment too and do not always work in favor of investors in fixed-period investments. In any event, completely insulating the portfolio from interest rate risk is unachievable.

5. The duration indicates the sensitivity of bond prices to changes in interest rates and there is inverse relationship between bond prices and interest rates. For a bond fund manager, interest rate anticipation is more difficult task. When he anticipates interest rates to decline, he has to increase the duration of his bond portfolio. For that he has to increase his investment in long duration bonds (i.e., long maturity and low coupon bonds). This enhances the opportunity to increase total return in the short run through price appreciation. Alternatively, if interest rates are expected to rise, moving into shorter-duration bonds i.e., short maturity and high coupon bonds aids in preserving capital, which, in turn, can stabilize or increase the total return in a market with falling prices. However, these may seem straightforward, once the direction of interest rates is decided. But, this strategy may not always provide expected result, when other factors are ignored. For example, bond fund manager anticipates a fall in interest rates. To take advantage of this expected decline, he considers increasing his holdings in long-term, low-coupon securities that are currently selling at a discount. The long duration of these bonds will make them especially sensitive to declining interest rates. However, such a move also produces a low-level of income through coupons and reinvestment at lower rates. Therefore, he can consider investing in longer-term current-coupon bonds. Although the duration of these bonds will not produce as much price appreciation as the low coupon discount securities, the additional income, when combined with some price appreciation, may provide a better overall return, especially, if interest rates decline only slightly. Thus, the decision about the type of long-duration

bonds to invest in, must consider the need for current income as well as how low and how soon the interest rates will fall. Further, regardless of his choice, he should choose marketable, highly liquid securities for ease in making the portfolio shift. This will enable him to restructure his portfolio with the greatest ease. In addition, he can emphasize quality (e.g., treasury securities), since the higher the quality, the more sensitive the prices are to changing interest rates.

Expectations of an increase in interest rates provide for altogether different portfolio considerations. When interest rates are expected to rise, a primary consideration for many investors is the preservation of capital, that is, the need to avoid large price declines due to increased interest rates. The natural instinct would be to move into very short-term, highly liquid investments such as money market securities whose short duration makes their values relatively insensitive to changes in market yields. As changes in interest rates usually affect the short-term yields more than long-term yields, these securities' yields will quickly reflect any rate increases. Therefore, he needs to consider various factors before changing duration of the portfolio based on interest rate anticipations.

## Section C: Applied Theory

6. The following are popular approaches of asset allocations:

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### Popular Approach

In the words of a layman, asset allocation can be looked at as a decision on how to divide the income between current spending and investment, and how to distribute the investment among the various possible avenues to attain the targeted goals. The methods in this approach generally try to capture a part of the wisdom that professionals get through years of study and practice into some rules of thumb.

### 100 Minus Your Age Method

According to this method, the percentage of your total investment that can be invested in equities depends on your age and is based on the premise that you will live to be 100 years old. The method suggests that the proportion of investment to be placed in equities is 100 minus your age. The rest may be placed in bonds and other safe investments.

Your Age	100 Minus Your Age	% Investment in Equities	% Investment in Bonds
30	70	70	30
40	60	60	40
50	50	50	50
60	40	40	60

Though life expectancy is increasing, the probability of a person living beyond 100 is still low. As the age increase, the ability to take risk normally declines. This method essentially addresses this issue.

The person who uses this method reduces his allocation to equities as he/she grows old. This method, while based on the general perceptions about the desirable exposure to equities over the life of a person, suffers from some obvious defects. It does not take into account the life expectancy of a person, the factor of inflation, the wealth to be accumulated or the current financial needs. Over the years, this method results in increase in the current income and decrease in growth, which can be harmful for the financial condition of the person considering inflation and increasingly long life expectancies.

### Financial Objectives Method

This method is based more on common sense than anything else. It simply says, plan your financial needs in future and invest enough money so that you will be able to realize them. It does not talk anything about how and where and when to invest. If your goals are short-term, invest in short-term liquid investments and if they are long term go for long-term investments. All that you have to know is what you want to achieve and how much you can save today for that.

### Cash Flow Needs Method

This Method, as the name suggests, involves projecting the cash flows of the future and estimating the deficit if any. Investments will then be aimed at filling the deficit. The sources of income that a person may have, for example, may be wages and salary, pension payments, interest and dividend income on investments already made, rental income from properties, sale proceeds of properties, inheritance of property, sale of used vehicle, etc. The outflows expected in future should then be reduced from the inflows. If there is a surplus, then you may go for conservative or safe investments. In case there is a deficit, investments will have to be made

aggressive and the degree of aggressiveness depends on the amount of deficit and the amount now available for investment.

#### **Risk Tolerance Method**

This method ignores the financials and focuses on the psychology of the individual. According to this method, a risk-averse person should invest all or most of the money available in low risk investments and a risk-lover may invest in high risk instruments.

#### **100% Common Stocks for Long Run**

This strategy involves placing all the long-term investments entirely in equity stocks. This method generally gets into popularity when stock markets are on a high and falls in popularity along with the markets. There is no other basis, scientific or otherwise, for it.

7. One of the primary factors driving bond portfolio managers towards indexing is the [< TOP >](#) unimpressive performance of the active management strategies. Poor and inconsistent performance of the active bond portfolio managers in the past has turned the investors to index funds. In the past, returns earned by most active fund managers could match or outperform the market indices; their performance was not consistent over a period of time. Therefore, the investors naturally turned to index funds where they could obtain consistently higher long-term returns and reliable short-term performance.

Another factor driving interest in index funds is the lower advisory fee schedule. Compared with active fund management, advisory fee schedule is very attractive for indexed funds. In the USA, advisory fees for index funds range between 30 and 70 percent of advisory fees for actively managed funds. This leads to substantial lower advisory fee schedule; transaction costs will also be lower for the index funds. This is because of lower turnover of assets and hence fewer transaction in the portfolio.

Another advantage of indexing is the degree of control exercised by the investor. Under active management, the investor has little control over the fund manager's investment decisions at any point of time. By indexing, the investor can specify the benchmark as well as the degree of latitude allowed to the index fund manager to deviate from the benchmark characteristics. For example, an active fund manager can change the duration of the portfolio to any extent depending on his interest rate forecast, but index fund manager may be constrained by, say, a maximum deviation of 10 per cent from the duration of the index. Thus, the investor can have a greater degree of control over investment under indexing strategy.

Indexing facilitates easier and better measurement of performance of the fund manager. Performance of a fund manager is measure by comparing the total return of the portfolio with the total return of the benchmark. Most widely used benchmarks are broad market indexes. Such comparison under active investment management has two serious shortcomings. The selected index may not be the appropriate benchmark for the fund manager. Secondly, deviations of portfolio characteristics from the benchmark characteristics, which explain the relative performance, are not thoroughly examined. These shortcomings can be overcome by indexing. Extensive search for the appropriate index must precede establishing the index fund, which ensures identification of an appropriate performance benchmark. Secondly, index fund investors can focus on the deviation of return of the portfolio from that of benchmarked index and require fund managers to attribute these deviations to specific benchmark characteristics.

Although indexing has many advantages over active management of portfolio, it has some disadvantages also. One of the main disadvantages of indexing is the loss of incremental returns, which could have been generated by investing in sectors with the highest performance. By not investing in better performing sectors and securities, the opportunity cost can be substantial. Different sectors and different types of securities like treasuries, corporate bond, mortgage-backed securities, etc., can generate incremental returns for the portfolio.

Another limitation of index funds is the rigid requirements associated with these funds. There may be attractive opportunities for investment outside the benchmark universe. If the fund manager is not allowed to invest in securities outside the universe of the benchmark index, then some attractive investment opportunities may be foregone.

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