B Com(H), VI Semester
Fundamentals of Investment

Q1 You have recently graduated as a major in finance and have been hired as a financial planner by Radiant Securities, a financial services company. Your boss has assigned you the task of investing Rs 1,000,000 for a client who has a 1-year investment horizon. You have been asked to consider only the following investment alternatives: T-bills, stock A, stock B, stock C, and market index.

The economics cell of Radiant Securities has developed the probability distribution for the state of the economy and the equity researchers of Radiant Securities have estimated the rates of return under each state of the economy. You have gathered the following information from them:

		Returns on Alternative Investments				
State of the Economy	Probability	T-Bills	Stock A	Stock B	Stock C	Market Portfolio
• Recession	0.2	6.0%	(15.0%)	30.0%	(5.0%)	(10.0%)
• Normal	0.5	6.0	20.0	5.0	15.0	16.0
• Boom	0.3	6.0	40.0	(15.0)	25.0	30.0

Your client is a very curious investor who has heard a lot relating to portfolio theory and asset pricing theory. He requests you to answer the following questions:

a. What is the expected return and the standard deviation of return for stocks A,B,C, and the market portfolio?

b. What is the covariance between the returns on A and B? Returns on A and C?

c. What is the coefficient of correlation between the returns on A and B? Returns on A and C?

d. What is the expected return and standard deviation on a portfolio in which stocks A and B are equally weighted? In which the weights assigned to stocks A, B, and C are 0.4, 0.4, and 0.2 respectively?

e. The beta coefficients for the various alternatives, based on historical analysis, are as follows:

Security	*Beta*
T-bills	0.00
A	1.20
B	(0.70)
C	0.90

i. What is the SML relationship?

ii. What is the alpha for stocks A, B, and C?

f. Suppose the following historical returns have been earned for the stock market and the stock of company D.

Period	Market	D
1	(5%)	(12%)
2	4	6
3	8	12
4	15	20
5	9	6

Q2

Madhav Dhar set up Magnum Securities in 1985 as a stock broking firm which acquired membership of Bombay Stock Exchange. The business of the firm expanded steadily and in 1995 Magnum Securities acquired membership of National Stock Exchange. Magnum Securities made an IPO in 2004.

Till 2002, the bulk of the income of Magnum Securities came from stock broking. From 2003, Magnum Securities offered portfolio management service dedicated to equity portfolios.

After graduating from a premier business school, you have worked in a mutual fund organisation looking after their dept schemes. Recently, Madhav Dhar met you at an investment conference where you gave a talk on debt mutual funds.

Impressed by your understanding of the debt market, Madhav Dhar has invited you to give a seminar to the board of directors of Magnum Securities to educate them on certain concepts in bond analysis, as Magnum Securities has recently set up a set up debt division. Madhav Dhar sees great potential in the debt market.

He also hinted, without making a firm offer, that he would like a person like you to head the debt division of Magnum Securities.

To educidate certain concepts in bond analysis he has requested you to use the following data on bond A which is currently one of the most actively traded bonds:

	Bond A
Face value	Rs. 1,000
Coupon (interest rate)	9 percent payable annually
Term to maturity	6 years
Redemption value	Rs. 1,000
Current market price	Rs. 1,046

a. What is the yield of maturity of bond A?

b. What is the duration of bond A?

c. What is the conceptual difference between years to maturity and duration?

d. What is the convexity of bond A?

Q3 2. During the past five years, the returns of a stock were as follows:

Year	*Return*
1	0.07
2	0.03
3	−0.09
4	0.06
5	0.10

Compute the following: (a) cumulative wealth index, (b) arithmetic mean, (c) geometric mean, (d) variance, and (e) standard deviation.

Q4

How Long Should You Wait You want to take up a trip to the moon which costs Rs. 1,000,000–the cost is expected to remain unchanged in nominal terms. You can save annually Rs. 50,000 to fulfill your desire. How long will you have to wait if your savings earn an interest of 12 percent?

Q5 1. Following are the price and other details of three stocks for the year 20X1. Calculate the total return as well as the return relative for the three stocks.

Stock	*Beginning Price*	*Dividend Paid*	*Ending Price*
A	30	3.40	34
B	72	4.70	69
C	140	4.80	146

Q6

A finance company advertises that it will pay a lumpsum of Rs. 44,650 at the end of five years to investors who deposit annually Rs. 6,000 for 5 years. What is the interest rate implicit in this offer?

Q7

1. The stock of Box Limited performs relatively well to other stocks during recessionary periods. The stock of Cox Limited, on the other hand, does well during growth periods. Both the stocks are currently selling for Rs 100 per share. You assess the rupee return (dividend plus price) of these stocks for the next year as follows:

	Economic Condition			
	High growth	*Low growth*	*Stagnation*	*Recession*
Probability	0.3	0.4	0.2	0.1
Return on Box's stock	100	110	120	140
Return on Cox's stock	150	130	90	60

Calculate the expected return and standard deviation of investing:

(a) Rs 1,000 in the equity stock of Box Limited

(b) Rs 1,000 in the equity stock of Cox Limited

(c) Rs 500 each in the equity stock of Box Limited and Cox Limited.

Q8

1. The financials of GSM Limited are given below:

Financials of GSM Limited

(Rs in million)

	20 X 1	20 X 2	20 X 3	20 X 4	20 X 5
Net sales	1020	1090	1210	1350	1520
Cost of goods sold	734	807	883	959	1095
Gross profit	286	283	327	391	425
Operating expenses	72	74	85	105	120
Operating profit	214	209	242	286	305
Non-operating surplus/deficit	11	14	18	−12	−5
PBIT	225	223	260	274	300
Interest	40	45	60	66	55
Profit before tax	185	178	200	208	245
Tax	35	38	40	52	50
Profit after tax	150	140	160	156	195
Dividends	60	60	65	65	70
Retained earnings	90	80	95	91	125
Equity share capital (Rs 10 par)	200	200	200	250*	250
Reserves and surplus	400	480	575	616	741
Shareholders' funds	600	680	775	866	991
Loan funds	400	450	550	600	615
Capital employed	1000	1130	1325	1466	1606
Net fixed assets	600	650	710	850	900
Investments	50	55	60	70	80
Net current assets	350	425	555	546	626
Total assets	1000	1130	1325	1466	1606
Market price per share (End of year)	60	55	65	57	75

Required

(a) Calculate the following for the last five years: Return on equity; Book value per share; EPS; Bonus adjustment factor; Adjusted EPS; PE ratio (prospective); PB ratio (restrospective); Retention ratio.

(b) Calculate the CAGR of sales, CAGR of EPS, and volatility of ROE

(c) Calculate the sustainable growth rate based on the average retention ratio and average return on equity for the past 3 years.

Q9

Ravi Rao is the Chief Executive Officer of Capmart Limited, an investment advisory firm. Ravi Rao has been requested to give a seminar to a group of finance executives drawn from state run universities. He has been requested to explain the basic concepts and tools useful in bond analysis. Ravi Rao has asked you to help him to make his presentation. In particular, you have to answer the following questions.

a. How is the value of a bond calculated?
b. What is the value of a 9-year, Rs 1,000 par value bond with a 10 percent annual coupon, if its required rate of return is 8 percent?
c. What is the value of the bond described in part (b) if it pays interest semi-annually, other things being equal?
d. What is the YTM of a 6-year, Rs 1,000 par value bond with a 10 percent annual coupon, if it sells for Rs 1,050?
e. What is the YTM of the bond described in part (d) if the approximate formula is used?

Q10

3. How do the following investments compare in terms of return, risk, marketability, tax shelter, and convenience: equity shares, bank deposits, public provident fund, residential house, and gold.

Q11

1. Assume that a group of securities has the following characteristics: (a) the standard deviation of each security is equal to σ_A and (b) covariance of returns σ_{AB} is equal for each pair of securities in the group. What is the portfolio variance for a portfolio containing four securities which are equally weighted?

Q12

Describe briefly the features of the following fixed income instruments: Government securities, Savings bonds, private sector corporate debentures, PSU bonds, and preference shares.

Q13

Explain the different measures of yield that are important for analyzing a bond's performance:

Q14

In the stock valuation framework, how can you tell whether a particular security is a worthwhile investment candidate? What roles does the required rate of return play in this process? Would you invest in a stock if all you could earn was a rate of return that just equaled your required return? Explain.

Q15

Each year financial periodicals like the *Wall Street Journal* and *Money Magazine* publish a list of the top performing mutual fund managers. And every year there are some fund managers who earn much higher returns than the market average, and in some cases they do so without taking above-average risk. Is this inconsistent with the efficient markets hypothesis?

Q16

If growth, income, and capital preservation are the primary objectives of mutual funds, why do we bother to categorize funds by type? Do you think such classifications are helpful in the fund selection process? Explain.