VCD/ 20 0423FYBBI SEM II QUANTITATIVE METHODS II $2\frac{1}{2}$ HRS 75 MARKS

N.B.: (1) Figures to the right indicate full marks.

(2) Use of simple calculator is allowed.

Q.1 (A) Fill in the blanks using correct alternatives:(Any Eight) (8)

(1) If we reject H_0 when H_0 is actually true, then we are committing _____ error.

(a)Type I (b)Type II (c)Type III (d)neither

(2) The linear function z which is to be minimized or maximized in a L.P.P. is called the _____.

(a)decision variable (b)objective function (c)optimal function (d)logical function

(3) If the rows and the columns of a matrix are interchanged with each other, we get _____.

(a)a row transformation of matrix (b) a column transformation of matrix

(c)inverse of matrix (d)transpose of matrix

(4) A matrix having n rows and 1 column is called _____ matrix.

(a)square (b)row (c)column (d)null

(5) The duplicate ratio of 5:2 is _____.

(a)2:5 (b)25:4 (c)7:2 (d)7:4

(6) If a:b:c = 5:6:4 then the ratio (a+b+c):a is equal to _____.

(a)5:6 (b)6:4 (c)15:5 (d)5:4

(7) Return is calculated as total gain divided by _____ as a %.

(a)selling price (b)purchase price (c)discounted price (d)return price

(8) The first systematic theory of portfolio management was put forth by _____.

(a)Minkowski (b)Markowitz (c)Sherit (d)Sharpe

(9) $M_4 = M_3 +$ _____.

(a)Post office savings deposits (b)Time deposits with bank

(c)Total post office deposits (d)Currency

(10) Infrastructure facilities consists of _____.

(a)Railways (b)Inflation (c)Income (d)Real income

(B) State whether following statements are True or False:(Any Seven) (7)

(1) A sample of size 30 is a large sample.

(2) The graph of $4x+3y \leq 12$ is a half-plane.

Q.3 (A) Find the inverse of matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$. (8)

(B) Monthly incomes of A and B are in the ratio 7:4 and their expenditures are in the ratio 9:5. Each of them saves Rs.10,000. Find their incomes. (7)

OR

(C) If $A = \begin{bmatrix} 4 & -1 \\ -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 2 \\ 3 & -4 \end{bmatrix}$, find the matrix X such that $2A - B + X = 0$ and Verify $(A + B)^T = A^T + B^T$. (8)

(D) In 4 days, 6 workers make 8 chairs. In 7 days, how many chairs will 9 workers make? (7)

Q.4 (A) For two shares S_1 *and* S_2, the following is known:

Expected return from $S_1 = 4.6$, Expected return from $S_2 = 7.3$

Total risk of investing in $S_1 = 78.40$, Total risk of investing in $S_2 = 30.02$

Covariance of returns from S_1 and $S_2 = 29.98$

If the portfolio has 20% invested in shares S_1 and 80% invested in shares S_2, then find the (i)Expected return of the portfolio (ii)Total risk of the portfolio (8)

(B) From the following information, calculate beta of the security. (7)

Year	Returns on Security (%)	Returns on Market Portfolio (%)
1	10	12
2	12	11
3	15	14
4	10	12
5	8	11

OR

(C) Given below are returns of shares of VCC Ltd. and LCC Ltd. Calculate Expected returns and Total risk for both the companies. (10)

Probability	Returns of VCC Ltd.
0.3	100
0.4	110
0.2	120
0.1	140

Probability	Returns of LCC Ltd.
0.3	150
0.4	130
0.2	90
0.1	60

(3) A square matrix whose determinant is zero is called a singular matrix.

(4) If two matrices are conformable, they can be added.

(5) The triplicate ratio of 1:2 is 1:8.

(6) Percentage of fraction 3/4 is 25%.

(7) The single index model was proposed by Markowitz.

(8) Risk is the chance of getting more returns of an investment.

(9) GDP growth rate is the least important economic indicator.

(10) NNP is GDP minus depreciation.

Q.2 (A) Solve the L.P.P. graphically. **(8)**

Maximize $Z = 2x + 3y$

Subject to $x \leq 3$

$x + y \leq 4$

$x \geq 0, y \geq 0$

(B) For a class project, a group of students of Maths is instructed to interview 37 students from their college and note down the number of films seen by the students in the last month. The results for the sample i.e. group: mean=7.1, S.D.=3.6. Find out 90% confidence interval for the mean number of films seen in the last month by students of the college. **(7)**

OR

(C) A random sample of size 40 was drawn and the sample mean was found to be 339. Test whether this sample has come from normal population with mean 342 and S.D. is 11.2 at 5% level of significance. **(8)**

(D) A company manufactures two products X and Y and each unit of product has to go through three machines A, B, C. Machine A can be operated for a maximum of 3000 minutes and it takes 10 minutes for one unit of product X and 5 minutes for one unit of product Y. Machine B can be operated for a maximum of 6000 minutes and it takes 5 minutes for one unit of product X and 10 minutes for one unit of product Y. Machine C can be operated for a maximum of 500 minutes and it takes 1 minutes for one unit of product X and 1 minutes for one unit of product Y. Profit per unit of product X is Rs.10 and product Y is Rs.15. Formulate L.P.P. to maximize profit. **(7)**

(D) Calculate the Expected return on the security. (5)

R_s(%)	Probability
0.35	0.04
0.25	0.08
0.15	0.14
0.05	0.17
0.05	0.26
0.15	0.18
0.25	0.09
0.35	0.04

Q.5 (A) Explain the different types of matrices with example. (8)

(B) What is meant by null and alternate hypothesis? (7)

OR

(C) Answer any three of the following. (15)

(i) Explain the terms GDP and GNP.

(ii) Write short note on price level and inflation.

(iii) Explain Type I and Type II error.

(iv) Explain the problems in estimating GDP in India.

(v) Write short note on nominal and real GDP.