Q. P. Code: 32428

Duration $2\frac{1}{2}$ hours **Total marks 75**

N.B 1 All questions are compulsory subject to internal choice

2) Figures to right indicate full marks

3) For questions 2 to 5, attempt either A and B or C and D

4) Use of simple calculator allowed

Q1 A) Fill in the blank (any 8) **(08)**

1.The simplex method reaches the optimal solution for maximization problem when _____

a)All $c_j - z_j$ are zero or positive b) All $c_j - z_j$ are zero or negative

c) some $c_j - z_j$ are positive d) none of these

2. If the rows and the column 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

3. The inverse ratio of 2:3 is _____
a)3:2 (b) 1:6 (c) 6 : 1 (d) none of these

4. The systematic risk is the risk _____ to the market

a) Related to b) independent to c) double of d) none of these

5. If the critical region is located on both the sides of sampling distribution of test statistic is_____

a) One tail b)two tail c)left tail d)right tail

6. A matrices having n rows and 1 columns is called _____

a) Square matrix b) row matrix c) column matrix d) null matrix

7. If a:b= 2:3 and b:c = 2:3 the a:b:c is equal to_____

a) 2:3:2 b) 2:6:2 c)4:6:9 d) 2:6:9

8. Electricity is a part of energy which in turn is a part of _____ of a nation

a) Level (b) infrastructure (c) inflation (d) none of these

9. The variables $x_1, x_2,...x_n$ in LPP are called _____

a) Decision (b) programming (c) feasible (d) objective

10. NDP=_____

a) GNP- Depreciation b) NNP-Depreciation c)GDP- Depreciation d) None of these

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B)State whether the statement is True or false (any 7) **(07)**

i) Determinant of a rectangular matrix can be found

ii) GDP is the most important indicator for the growth of the country

iii) The Linear function Z which is to be maximized or minimised is called objective function.

iv) In the process of testing, a statistician starts with a hypothesis called alternate hypothesis

v) Matrix multiplication is commutative

vi)A is matrices of order 2× 3 then order of tranpose of A is also 2× 3

vii) If beta coefficient is more than one, security is less volatile as compared to market

viii) A variable added to make inequality of less than type equal is called slack variable

ix)Returns mean profit earned on capital invested in the business

x) The difference between total revenue and total expenditure is called GDP

Q 2. A) A random sample of size 40 was drawn and the sample mean was found to be 339. Test whether this sample has come from a normal population with mean 342 and standard deviation 11.2 at 5% level of significance **(07)**

B) Min Z=20 $x_1 + 40x_2$ **(08)**

Subjected to

$$72x_1 + 12x_2 \geq 216$$
$$6x_1 + 24x_2 \geq 72$$
$$40x_1 + 20x_2 \geq 200$$
$$x_1, x_2 \geq 0$$

OR

C) Solve the following using simplex method **(10)**

Max $z = 20x_1 + 22x_2$

Subject to Constraints

$$2x_1 + 3x_2 \leq 36$$

$$2x_1 + x_2 \leq 10$$

$$x_1 \geq 0, x_2 \geq 0$$

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D)A manufacture makes Rs 600 profit on stereo system and Rs 400 profit on small tape recorder. A stereo requires 1 hour on machine A and 1 hour on machine B and 4 hours on machine C. A tape recorder requires 2 hours on A ,1 hour on B and 1 hour on C. In a given day, machine A, B and C working a maximum of 16,9 ,24 hours respectively. How many stereo system and tape recorders should be produced per day to maximize the profit.Formulate linear programming problem **(05)**

Q3A) Solve the following systems of equation simultaneously **(07)**

$x + y - z = 3$

2x+3y+z=10

3x-y+7z=4

B) i)Find $A^2 + B$ where A=$\begin{bmatrix} 2 & 4 \\ 5 & 6 \end{bmatrix}$ and A=$\begin{bmatrix} 1 & 4 \\ 1 & 6 \end{bmatrix}$

ii)A person sold an article at 572.40 Rs and gained 6%. find cost price of article **(08)**

OR

C) Three shopkeeper A,B and C go to a store to buy stationary

A purchases 12 dozen notebooks ,5 dozen pens and 6 dozen pencils

B purchases 10 dozen notebooks ,6 dozen pens and 7 dozen pencils

A purchases 11 dozen notebooks ,13 dozen pens and 8dozen pencils.

The cost of notebook is Rs40 , a pen is Rs 1.25 and pencil cost 35 paisa. Use matrix multiplications to calculate each individual's bill. **(08)**

D) A, Band C enter into business. The capital of A and B are in ratio 5:3 and the capital of B and C are in ratio 2:7 .Distribute the profit of 27000 earned by the business at the end **(07)**

Q4A) From the following table calculate expected return and risk for XLtd.and Yltd and advice whether the companies are good for investment **(07)**

State of Economy	A Ltd		B Ltd	
	Probability	Return	Probability	Return
Recession	0.3	6	0.5	9
Normal	0.3	12	0.3	12
Boom	0.4	20	0.2	24

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B) From the following data calculate Beta of security and interpret **(08)**

Year	Return on Security%	Returns on MarketPortfolio %
1	20	15
2	18	16
3	23	20
4	15	10
5	10	14
6	26	29

OR

QC) From the following information, find **(10)**

i)Expected Return and variance of each security and comment on it

iii)Expected Return and Risk of a portfolio with 75% proportion of security A and 25% proportion of security B and comment on it

State	Probability	Return on stock A %	Return on stock B%
1	0.2	5	50
2	0.3	10	30
3	0.4	15	10
4	0.1	20	16

D)Following securities are held by an investor in his portfolio

	Security X	Security Y
Expected Returns	15	20
Expected variance	16	25

Covariance XY=8

What is the correlation of these securities? Interpret. **(05)**

Q5 A) Explain in short systematic risk and unsystematic risk **(08)**

B) Explain The concept of the decision criterion and critical region for **(07)**

i) two tail test

ii)one tail test

OR

C) Write short notes (any three) **(15)**

i) Level of significance in testing of hypothesis

ii) Trade Balance

iii) Nominal GDP and real GDP

iv) Slack variable, surplus variable and basic feasible solution

v) Different measures of money supply

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