

Duration: 2 ½ Hours

Maximum Marks: 75

N. B.: 1) All questions are compulsory.

2) Attempt any two sub-questions from questions 1 to 3.

3) Attempt any one sub-question from a or b and any one sub-question from c or d from question 4.

4) Figures to the right indicate full marks.

5) Use of non-programmable scientific calculators is allowed.

Q1 a Describe (i) Mid-Square Method and (ii) Multiplicative Congruential Method for generating random numbers. 10

b What is Simulation? Explain the uses of Simulation. 10

c Discuss the Inverse method of generation of random observations from: 10
(i) Uniform distribution and (ii) Exponential distribution.

d Explain the algorithm of Monte Carlo technique used in simulation. 10

Q2 a Explain the procedure to find the optimum solution using graphical method for a (m x 2) game. 10

b Derive the optimal strategies for players A and B engaged in a two-person zero sum game with no saddle point when the pay-off matrix for player A is given by

$$\begin{array}{c} \text{B} \\ \text{A} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \end{array}$$

Hence, obtain an expression for the value of the game.

c What are decision trees? When are they used? Explain with simple example. 10

d Discuss the problem of decision making under risk. 10
Explain the terms EMV and EVPI.

- Q3 a Explain the concept of R^2 and adjusted R^2 with respect to testing individual coefficients. 10
- b In a multiple linear regression model, explain individual testing for significance of β coefficient. 10
- c Explain the terms: (i) Coefficient of Determination (ii) Multicollinearity 10
- d State the assumptions made for Classical Linear Regression Model. 10
- Q4 a Describe the Inverse method of generation of random observations from Normal distribution. 8
- b Discuss the problem of Decision making under uncertainty. Explain (i) Laplace Criterion, (ii) Hurwicz criterion. 8
- c Define the following terms with respect to game theory: 7
(i) Saddle Point (ii) Mixed Strategy (iii) Pure Strategy (iv) Value of the Game
- d Write a note on Autocorrelation. 7

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