# NF-127

**November-2021**

**B.Sc., Sem.-V**

**305 : Statistics**

**(Business Statistics)**

**Time : 2 Hours]** [**Max. Marks : 50**

**Instructions :** (1) There are two sections in this question paper.

(2) **All** questions in Section – I carry equal marks.

(3) Attempt any **three** questions from Section – I.

(4) Section – II is **compulsory**.

(5) Figures to the right indicate full marks of the questions/sub-questions.

## Section – I

Attempt any **three** Questions from Section – I.

1. (a) Define Markov Chain. Give two illustrations of Markov Chain. **7**

   (b) Define different states associated with Markov chain, giving one example of each state. **7**

2. (a) State and prove the Chapman Kolmogorov equation for discrete Markov chain. **7**

   (b) What is transition probability matrix ? **7**

   For the following transition matrix, with initial distribution probability

   $Pr[X_0 = i] = 1/3$, i=0, 1, 2, then, find $P[X_1 = 1 \mid X_0 = 2]$, $P[X_2 = 2 \mid X_1 = 1]$ and $P[X_2 = 2, X_1 = 1 \mid X_0 = 2]$

   $$\begin{bmatrix} 3/4 & 1/4 & 0 \\ 1/4 & 1/2 & 1/4 \\ 0 & 3/4 & 1/4 \end{bmatrix}$$

3. (a) Define term: Decision Theory, Actions (or strategies), Events, Decision under risk, payoff matrix E. M. V., E. V. P. I. **7**

 (b) Describe the procedure of Hurwicz Principle with illustration. **7**

4. (a) Explain Maximin Principle (criterion) with illustration. **7**

 (b) State different principles used in decision theory. Also, explain the Laplace principle. **7**

5. (a) What is *simulation* ? **7**

 (b) Give reasons for using *simulation* in real life situations. **7**

6. (a) State different steps involved in *simulation*. **7**

 (b) State *simulation* method of generating random numbers. **7**

## Section – II

7. Answer any **eight (08)** from following : **8**

 (1) What is Stochastic process ?

 (2) Define transition probability.

 (3) Define decision under uncertainty.

 (4) Give another name for Maximax Principle.

 (5) When optimization techniques fail to solve a problem, simulation is a better approach. Do you agree ?

 (6) What is the role of E. P. P. I in decision theory ?

 (7) In what way simulation is a descriptive technique ? Explain in brief.

 (8) How many phases are involved in Simulation technique ?

 (9) State the role of simulation technique in Inventory management.

 (10) State one application of Markov chain.

_____