

2122

B.A./B.Sc. (General) First Semester  
Statistics

Paper – 101: Probability Theory and Descriptive Statistics - I

Time allowed: 3 Hours

Max. Marks: 65

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two question from each Unit.

x-x-x

1. Define the following:-

- i. Histogram and Bar diagram. (2)
- ii. Sheppard's Correction for moments (2)
- iii. Relative measures of dispersion. (1)
- iv. Mutually exclusive events. (2)
- v. Distribution Function. (2)
- vi. Moment Generating Functions. (2)
- vii. Classical theory of probability and give its limitations. (2)

UNIT-I

2. (i) What is the difference between additive and multiplicative law of probability. Also discuss the conditions for independent events. (8)  
(ii) Six members of supervisory staff are moving randomly between two interconnected wards. What is the probability that at one point of time all the six will be in either of the wards? (5)
3. (i) State and Prove Bayes Theorem. (6)  
(ii) The probabilities of X, Y and Z becoming managers are  $\frac{4}{9}$ ,  $\frac{2}{9}$  and  $\frac{1}{9}$  respectively. The probability that the Bonus scheme will be introduced if X, Y and Z becomes managers are  $\frac{3}{10}$ ,  $\frac{1}{2}$  and  $\frac{4}{5}$  respectively. What is the probability that Bonus Scheme will be introduced? (7)
4. (i) Differentiate between pmf and pdf. Two cards are drawn one by one without replacement from a well shuffled pack of 52 cards. Find the probability distribution of the number of aces. (7)  
(ii) A die is tossed twice. Getting a number greater than 4 is considered a success. Find the variance of the probability distribution of the number of success. (6)
5. (i) Define moment generating function and its properties. (5)  
(ii) The joint probability distribution of two random variables X and Y is given by  $P(X = 0, Y = 1) = \frac{1}{3}$ ,  $P(X = 1, Y = -1) = \frac{1}{3}$ , and  $P(X = 1, Y = 1) = \frac{1}{3}$   
Find (a) marginal distribution of X and Y  
(b) conditional distribution of X given Y = 1. (8)



(2)

**UNIT – II**

6. (i) Distinguish between classification and tabulation of statistical data. Mention the requisites of a good statistical table. (6)
- (ii) Define Primary data. Explain the methods of collecting primary data. (7)
7. (i) What is the importance of ogives? How do you construct an ogive curve. (6)
- (ii) To represent the information on number of patients suffering from seven diseases in a hospital over two years, which graph is suitable and discuss why? (7)
8. (i) Define mean and median of a frequency distribution. Compare and contrast them as a measure of central tendency. Give examples to illustrate your statements. (8)
- (ii) Explain the importance of Box and Whisker plot. (5)
9. (i) A sleep-inducing drug was given to two groups of 10 patients each. The following data on additional hours of sleep gained were obtained:
- 4.1, 3.7, 2.8, 1.4, 1.8, 3.1, 2.2, 2.2, 3.2, 3.9 ; Compute CV. (7)
- (ii) Explain the measures of Skewness based on moments. (6)

X-X-X