Roll No. 8021381008 Total Pages : 3

BT-2/M-22 **42037**

PROBABILITY AND STATISTICS

Paper–BS-134A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) State and prove addition theorem of probability for n events.

   (b) Prove the multiplication rule of probability.

2. A random variable X has the following probability mass functions :

$$P(x) = \begin{cases} 1/4; \text{ for } x = -2 \\ 1/4; \text{ for } x = 3 \\ 1/2; \text{ for } x = 6 \\ 0 \text{ otherwise} \end{cases}$$

Evaluate :

(i) $P(2x - 3 > 1)$ (ii) $P(x^2 - 2x \leq 3)$

(iii) $P|x| < 1$ (iv) Find distribution function.

UNIT–II

3. (a) Show that Normal distribution is a limiting case of binomial distribution.

   (b) Find the mode of the Poisson distribution with mean value 5.

4. Discuss the following terms with the help of example :

   (a) Continuous Random Variable.

   (b) Probability Density Function.

   (c) Expectation of Continuous Random Variable.

   (d) Distribution Function.

UNIT–III

5. (a) Show that the co-efficient of correlation is independent of change of scale and origin of the variables and state the limits between co-efficient of correlation lies.

   (b) Show that the coefficient of correlation is the geometric mean of coefficients of regression.

6. The median and mode of the following wage distribution are known to be Rs. 33.5 and Rs. 34 respectively. Find the values of A, B and C :

Wage(in Rs.) :	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of person:	4	16	A	B	C	6	4

Total number of person is 230.

UNIT–IV

7. Random sample drawn from two countries gave the following data relating to the heights of adult males :

	Country A	Country B
Mean Height (in inches)	87.51	87.31
Standard Deviation (in inches)	3.6	3.58
Number in samples	1000	1200

   (i) Is the difference between the means significant at 5% level of significance?

   (ii) Is the difference between the standard deviations significance at 5% level of significance?

8. (a) Explain in detail fitting of a polynomial of degree m.

   (b) A random sample of 10 student's marks in Mathematics and Statistics are given below. Test whether the correlation exists between the marks of two subjects at 5% level of significance. ($t_{0.05} = 2.36$ for 08 degree of freedom)

Marks in Mathematics : 68 54 78 75 76 85 54 68 87 75

Marks in Statistics : 59 68 72 67 72 78 64 58 68 74