Roll No
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Total No. of Pages : 02

Total No. of Questions : 09

## B.Sc. Hons. (Mathematics) (Sem.-4) PROBABILITY AND STATISTICS Subject Code : UC-BSHM-404-19 M.Code : 79913 Date of Examination : 20-12-22

Time: 3 Hrs.

Max. Marks : 60

## INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION B & C. have FOUR questions each.
- 3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
- 4. Select atleast TWO questions from SECTION B & C.

# **SECTION-A**

#### I. Write short notes on :

- a) Find the mean of the squares of first 150 natural numbers.
- b) In a frequency distribution, the coefficient of skewness based on quartiles is 0.12. If the sum of upper and lower quartiles is 100 and the median is 38, find the value of upper quartile.
- c) Find the expectation of the number on a dice when thrown.
- d) Two dice are thrown. Find the probability that the numbers on the two dice are different.
- e) Six coins are tossed 6400 times. Using Poisson distribution, find the approximate probability of getting six heads.
- f) If n = 24 and  $\sum D^2 = 240$ , what is the coefficient of Rank Correlation?
- g) Calculate the regression equation Y on X from the following data:  $\Sigma X = 300$ ,  $\Sigma Y = 250$ ,  $\Sigma XY = 123$ ,  $\Sigma X^2 = 138$ ,  $\Sigma Y^2 = 164$ , N = 10.
- h) Fit a linear curve to the data  $\Sigma X = 15$ ,  $\Sigma Y = 204$ ,  $\Sigma XY = 748$ ,  $\Sigma X^2 = 55$ .
- i) A dice is rolled once. If the random variable X is "getting an even number", find the probability distribution of X.

j) Calculate the standard deviation of the data:  $\sum f.(X - \overline{X}) = 40$ ,  $\sum \overline{X} f.(X - \overline{X})^2 = 712$ , n = 21

#### **SECTION-B**

- 2. Calculate the first four moments of a frequency distribution about the value 5 are: -4, 22, -117, and 560. Find the moments about the mean.
- 3. Calculate coefficient of skewness based on the following data

Variable :	0	10	20	30	40	50	60	70	80
Frequency :	150	140	100	80	80	70	30	14	0

4. Fit an exponential curve of the form  $y = ae^{bx}$  to the following data:

<i>x</i> :	1	5	7	9	12
<i>y</i> :	10	15	12	15	21

5. Find the two regression lines for the following data:

X :	1	2	3	4	5	6	7	8	9
Y :	9	8	10	12	11	13	14	16	15

#### **SECTION-C**

- 6. The probability of a man hitting a target is  $\frac{1}{4}$ . He fires 7 times. What is the probability of his hitting atleast twice the target? Also find that how many times must he fire so that probability of hitting the target atleast once is greater than  $\frac{2}{3}$ .
- 7. A company has two plants to manufacture scooters. Plant I manufactures 70% of scooters and Plant II manufactures 30%. At Plant I, 80% of the scooters are rated as of standard quality and at Plant II, 90% of the scooters are rated as of standard quality. A scooter is chosen at random and is found to be of standard quality. What is the probability that it has come from Plant II?
- 8. Let the probability density function f(x) be positive at x = -1, 0, 1 and zero elsewhere. If f(0) = 1/4 and if E(X) = 1/4, determine f(-1) and f(1).
- 9. Three stale apples got mixed up with 7 fresh apples. If 3 apples are drawn (without replacement) from 10 apples, find the mean and variance for the number of stale apples among them.

# NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.