

Computer Oriented Statistical Methods

1. Short answer type questions :

- (a) Show that sum of deviations about arithmetic mean is zero.
- (b) If regression coefficient of Y on X is $\frac{4}{5}$ and X on Y is $\frac{9}{20}$, find correlation coefficient between X and Y. 3
- (c) Determine the binomial distribution for which the mean is 4 and variance 3 and find its mode. 3
- (d) Discuss the importance of standard error in large sample theory.
- (e) Describe T-test single mean. 3
- (f) State the basic assumptions in ANOVA. 3

UNIT-I

- 2. The first four moments of a distribution about the origin are 1, 4, 10 and 46 respectively. Prove that the given distribution is symmetrical and normal. Find also mean, median, mode and variance of the distribution. 18
- 3. (a) The first of the two samples has 100 items, with mean 15 and variance 9. If the whole group has 250 items with mean 156 and variance 13.44, find the variance of second group.

- (b) Prove that for any discrete distribution standard deviation not less than mean deviation from mean. 9

UNIT-II

4. (a) Given that the regression equations of Y on X and X on Y are respectively $Y = X$ and $4X - Y = 3$, and that the second moment of X about the origin is 2, find the correlation coefficient between X and Y and .
 (b) Prove that regression coefficients are independent of the change of origin but not of scale.
5. (a) If X and Y are independent Poisson variates such that :
 $P(X = 1) = P(X = 2)$ and $P(Y = 2) = P(Y = 3)$
 Find the variance of $X - 2Y$.
 (b) The incidence of occupational disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of six workers choosen at random, four or more will suffer from the disease.

UNIT-III

6. (a) Fit the curve $y = ax^2 + (b/x)$ to the following data :
- | x | 1 | 2 | 3 | 4 |
|---|-------|------|------|------|
| y | -1.51 | 0.99 | 3.88 | 7.66 |
- (b) Enumerate any three applications of chi-square distribution.
7. Write an algorithm for fitting the curve $Y = ae^{bx}$. 18

UNIT-IV

8. (a) State and prove Baye's Theorem in decision-making. 9
 (b) The contents of urns I and II are as follows :
 1 white, 2 black and 3 red balls and 2 white, 1 black and 1 red ball. One urn is chosen at random and two balls drawn. They happen to be white and red. What is the probability that they come from urn II ?
9. The following table shows the lives in hours of four batches of electric lamps :

1	1600	1610	1650	1680	1700	1720	1800
2	1580	1640	1640	1700	1750		
3	1460	1550	1600	1620	1640	1660	1740 1820
4	1510	1520	1530	1570	1600	1680	

Perform an analysis of variance of these data and show that a significance test does not reject their homogenrity (Tabulated \bar{F} for 3 and 22 df = 3.05). 18.