

Total number of printed pages-4

1 (Sem-2) STA

2024

**STATISTICS**

Paper : STA0200104

**( Correlation & Regression, Probability  
Distributions, Statistical Inference-I  
and Finite Difference )**

Full Marks : 45

Time : Two hours

**The figures in the margin indicate  
full marks for the questions.**

1. Answer the following questions : 1×5=5

- (a) Karl Pearson's correlation coefficient lies between \_\_\_\_\_ and \_\_\_\_\_.  
(Fill in the blanks)
- (b) For binomial distribution, mean > variance. (true or false)
- (c) Define level of significance.
- (d) What is categorical data?
- (e) What is the relation between  $\Delta$  and  $E$ ?

Contd.



2. Answer **any five** from the following questions :  $2 \times 5 = 10$

- (a) Write *two* properties of Karl Pearson's correlation coefficient.
- (b) Write Simpson's  $\frac{1}{3}$ rd rule of numerical integration.
- (c) Find the mean of binomial distribution.
- (d) Define type I and type II errors.
- (e) Why there are *two* regression lines?
- (f) Prove that  $(1 + \Delta)(1 - \Delta) = 1$
- (g) Write *two* properties of  $\Delta$  and  $E$ .
- (h) Write *two* instances where Poisson distribution may be employed.
- (i) For a binomial distribution  $n = 10$   
 $p = \frac{1}{2}$ . Find  $p(x = 2)$ .

3. Answer **any four** questions :  $5 \times 4 = 20$

- (a) Write a short note on principle of least square.

(b) Describe the properties of normal distribution.

(c) Describe the test of goodness of fit using chi-square test.

(d) Derive Newton's forward interpolation formula.

(e) Define divided differences. Prove that the third, divided differences with the arguments  $a, b, c$  and  $d$  of the function  $\frac{1}{x^2}$  is equal to

$$\frac{abc + bcd + dca + abd}{a^2b^2c^2d^2}$$

(f) Write a short note on 'general quadrature formula' in the case of numerical integration.

(g) Describe  $t$ -test for testing single mean.

(h) Prove that correlation co-efficient is independent of change of origin and scale.

4. Answer **any one** question from the following : 10

- (a) Write a note on scatter diagram. Describe how we can study the correlation between two variables with the help of scatter diagram.



- (b) Define Poisson distribution. Derive the distribution as a limiting case of binomial distribution.
- (c) Describe the properties of divided differences and prove *any one* of them.
- (d) Explain the test of significance for an observed proportion in case of large sample. A coin was tossed 100 times and 75 heads were observed. Test whether the coin is unbiased.