

**2003001104040001 / 2003000204040060**  
**EXAMINATION FEBRUARY-MARCH 2024**  
**BACHELOR OF SCIENCE (FOURTH SEMESTER)**  
**STATISTICAL METHODS - II - LEVEL 4**

[Time: As Per Schedule]

[Max. Marks: 50]

**Instructions:**

1. Fill up strictly the following details on your answer book
  - a. Name of the Examination: **BACHELOR OF SCIENCE (FOURTH SEMESTER)**
  - b. Name of the Subject: **STATISTICAL METHODS - II - LEVEL 4**
  - c. Subject Code No: **2003001104040001 / 2003000204040060**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.
5. Logarithmic tables and statistical tables will be supplied on request.
6. Non programmable scientific calculator is allowed.

Seat No:

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Student's Signature

**Q.1 Answer briefly.**

**8**

1. For a Poisson distribution,  $P(2) = P(3)$ , then write its probability function.
2. If  $b_{yx} = -0.09$  and  $b_{xy} = -0.04$  then find correlation coefficient.
3. If equation of trend is  $y = 1 + 2x - 3x^2$  then find the value of trend at  $x=1,2,3,4$ .
4. Calculate Laspeyer's and Paasche's price index from the given information.  
 $\sum p_0q_0 = 580, \sum p_0q_n = 960, \sum p_nq_0 = 690$  and  $\sum p_nq_n = 1150$

**Q.2 A. Attempt any one.**

**5**

1. Write properties of Poisson distribution and show that, mean = variance of it.
2. Write p.d.f. of Normal distribution with its properties.

**B. Attempt any two.**

**10**

1. If X is normal variable with mean = 20 and S.D. = 10. Find  $P(x < 30)$ ,  $P(x > 45)$  and  $P(15 < X < 40)$
2. A gear manufacturing company expects that the chance of a gear being defective is  $1/200$ . The gears are supplied in boxes of 10 gears. Find the

probability that there are no defective, one defective and two defective gears in consignment of 10,000 boxes. ( $e^{-0.05} = 0.9512$ )

- If X is a binomial variate and if for  $n=6$  and  $4p(x = 4) = p(x = 2)$  then find  $\beta_1$ , and  $p(x \geq 5)$ .

**Q.3 A. Attempt any one**

**5**

- Interpret  $r = -1, 0, 1$  with suitable examples.
- What is regression? Why there are two regression lines? Under which condition do we have only one regression line?

**B. Attempt any two.**

**10**

- The two regression lines are  $4x - 5y + 33 = 0$  and  $20x - 9y - 107 = 0$ ,  $V(y) = 4$ . Then calculate, (1): Means of x and y., (2): Standard deviation of x., (3): Correlation coefficient x and y.
- Find Karl-Pearson coefficient of correlation for the following data and comment on the results.

X	23	28	26	32	25	27	30	35	38	36
Y	19	22	24	28	21	25	24	32	36	29

- The ranks in Elocution competition and in essay competition of students of a class are given in the following brackets: find coefficient of rank correlation.  
(3,2), (1, 3), (6, 5), (7, 6), (2, 4), (5, 7), (4, 1), (8, 8), (10, 12), (9, 11), (12, 10), (11,9)

**Q.4 Answer any three of the following questions.**

**12**

- What is trend? Discuss method of least squares with merits and demerits.
- Verify that the Factor Reversal test and Time Reversal test are satisfied by Fisher's formula for given information.

Commodity	Base Year		Current Year	
	Price per unit	Quantity	Price per unit	Quantity
A	10	8	13	6
B	3	30	6	30
C	2	40	2	48
D	5	20	8	25

3. What is index number? Write main steps of construction of index numbers.
4. Fit a Straight line trend to the following data by the method of least squares and obtained the trend values and estimate sales for the year 2025.

Year	1995	2000	2005	2010	2015	2020
Sales (Rs. Lakhs)	13.0	14.4	13.8	12.0	17.4	19.0

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