Seat No.

Total No. of Pages : 4

OCT-NOV 2025 WINTER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Probability & Statistics

Sub. Code: 114468/112920

Day and Date: Tuesday ,16-12-2025 **Total Marks: 60**

Time: 02:30 PM To 05:00 PM

Instructions: **1. Assume suitable data wherever necessary and mention it boldly**
2. Figures to the right indicate full marks

Special Inst.: **1) Question No.1 and Question No. 5 are compulsory.**
2) Solve any TWO questions from Q.No. 2 to Q.No. 4.
3) Use of Non-programmable scientific calculator is allowed.

Q1) Attempt any Three of the following **[15]**

a. Find the mean by step deviation method for the following data. **[5]**

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	15	18	23	27	24	19

b. For the following data calculate Karl Pearson's coefficient of correlation. **[5]**

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

c. Find the value of k, if the following function is a probability density function. **[5]**

$$F(x) = \{kx^2(1-x^3), \quad 0 \le x \le 1,$$

$$=0 \quad , \quad otherwise$$

d. Find the Geometric mean of the following frequency distribution. **[5]**

Monthly Wages (in Rs.)	125-175	175-225	225-275	275-325	325-375	375-425	425-475	475-525	525-575
No. of workers	2	22	19	14	3	4	20	1	1

Q2) Solve the following. **[15]**

a. In a city A, 20% of a random sample of 900 students has a certain slight physical defect. In another city B,18.5% of random sample of 1600 students has the same defect. Is the difference between the proportions significant at 5% level of significance? **[8]**

b. A die was thrown 9000 times and of these 3400 yields a 2 or 3. Can the die be regarded as unbiased? **[7]**

Q3) Solve the following **[15]**

a. For the following fuzzy sets A and B, Find the fuzzy cardinality of AUB **[8]**

$$A = \left\{\frac{0.1}{x_1} + \frac{0.25}{x_2} + \frac{0.2}{x_3} + \frac{0.9}{x_4} + \frac{0.35}{x_5}\right\}, B = \left\{\frac{0.7}{x_1} + \frac{0.5}{x_2} + \frac{0.1}{x_3} + \frac{0.95}{x_4} + \frac{0.30}{x_5}\right\}$$

b. If $\mathbf{A} = \left\{\frac{0.6}{1} + \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.3}{4} + \frac{1}{5}\right\}$ and $B = \frac{1}{1+10x}$ $x \in \{1,2,3,4,5\}$ **[7]**

Find (i) $^{0.4}(\overline{A \cup B})$ (ii) $^{0.3}(\overline{A} \cap B)$

Q4) Solve the following. **[15]**

a. Solve the following assignment problem. **[8]**

Tasks

Persons	P	Q	R	S	T
A	130	100	145	160	170
B	105	90	100	130	145
C	110	80	125	140	155
D	20	20	50	50	80
E	25	5	40	50	75

b.

Solve the following assignment problem for minimal optimal cost. **[7]**

Machines

Operators	P	Q	R	S	T
I	8	4	2	6	1
II	0	9	5	5	4
III	3	8	9	2	6
IV	4	3	1	0	3
V	9	5	8	9	5

Q5) Attempt any Three of the following. **[15]**

a. In a sample 400 parts manufactured by a factory, the number of defective parts was found to be 40. The company, however, claimed that at most 5% of their product is defective. Is the claim tenable? **[5]**

b. Define scalar cardinality and Level set. Hence find scalar cardinality of A and L(A) for the following fuzzy set **[5]**

$$A = \{\frac{0}{a} + \frac{0.2}{b} + \frac{0.5}{c} + \frac{0.2}{d} + \frac{0}{e} + \frac{1}{f} + \frac{0}{g} + \frac{0.5}{h} + \frac{1}{i} + \frac{0.1}{j}\}$$

c. Solve the assignment problem to maximize the profit. **[5]**

Jobs

Workers	A	B	C	D
I	16	12	14	16
II	18	13	13	14
III	15	16	11	15
IV	17	14	12	18

d. Find the heights of the fuzzy sets C and D where $C(x) = \frac{x}{x+1}$, $x \in [0,1,2,3,4,\ldots,10\}$, and $D(x) = 1 - \frac{x}{10}$, $x \in \{0,1,2,3,4,\ldots,10\}$ .State which set is normal and which set is subnormal? Find Supp C, and core D. **[5]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (11731) Bachelor of Technology (NEP-2.0) (112920) Probability & Statistics Part 2 SEM 3
2] (1154) B.Tech. CBCS (114468) Probability & Statistics Part 2 SEM 3