

Seat No. **OCT-NOV 2025 WINTER EXAMINATION****1154 B.Tech. CBCS****Sub. Name: Probability & Statistics****Sub. Code: 86160****Day and Date: Tuesday ,16-12-2025****Total Marks: 70****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) Attempt any Three questions from Q.1 to Q.4.  
2) Attempt any Three questions from Q. 5 to Q. 8.  
3) Use of non-programmable scientific calculator is allowed.

**Q1) Solve the following** **[12]**

**a.** **[6]**  
Calculate the median and mode for the following data.

Income (Rs.)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	4	6	20	10	7	3

**b.** **[6]**  
Calculate the standard deviation from the following data.

Class Interval	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	3	61	132	153	140	51	2

**Q2) Solve the following** **[11]**

**a.** **[5]**  
Calculate the coefficient of correlation between x and y for the following data.

x	2	4	5	6	8	11
y	18	12	10	8	7	5

**b.** **[6]**  
Find the equation of line of regression y on x for the following data.

x	40	34	28	30	44	38	31
y	32	39	26	30	38	34	28

**Q3) Solve the following.** **[11]**

- a. If the mean of the binomial distribution is 12 and the variance is 4, find the probability of two successes. [5]
- b. The marks obtained by 900 students in an examination are found to be normally distributed with mean 70 and standard deviation 5. Find the number of students getting marks [6]
- (i) between 60 and 75,
- (ii) more than 75.
- [Given: For S.N.V.  $z$  area from  $z = 0$  to  $z = 2$  is 0.4772, and from  $z = 0$  to  $z = 1$  is 0.3413]

**Q4)** Solve the following. [12]

- a. Fit the curve  $y = a + bx + cx^2$  to the following data. [6]

x	0	1	2	3	4
y	-4	-1	4	11	20

- b. If 5 % of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 10 bulbs [6]
- (i) at the most one is defective.
- (ii) at least one defective.

**Q5)** Solve the following. [12]

- a. A manufacturer claimed that at least 95 % of the equipment which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test this claim at 5 % level of significance. [6]
- b. A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Can the die be regarded as unbiased? [6]

**Q6)** Solve the following. [11]

- a.

If the fuzzy sets A and B are defined by

$$A(x) = \frac{0.3}{x_1} + \frac{0.7}{x_2} + \frac{0.9}{x_3} + \frac{0.5}{x_4} + \frac{0.1}{x_5}, \quad B(x) = \frac{0.9}{x_1} + \frac{0.5}{x_2} + \frac{0.8}{x_3} + \frac{0.2}{x_4} + \frac{0.3}{x_5}$$

Find  $\bar{A} \cap B, A \cup \bar{B}, A \cup \bar{A}, B \cup \bar{B}$ .

b.

Find  $\alpha$ -cuts and strong  $\alpha$ -cuts of the fuzzy set

[5]

$$B(x) = \frac{x}{10}, \quad X = \{0,1,2, \dots, 10\} \quad \text{for } \alpha = 0.3, 0.5.$$

Q7) Solve the following assignment problem.

[11]

	A	B	C	D	E
I	130	100	145	160	170
II	105	90	100	130	145
III	110	80	125	140	155
IV	20	20	50	50	80
V	25	5	40	50	75

Q8) Solve the following.

[12]

a.

In order to test whether a coin is perfect, it is tossed 5 times. The null hypothesis of perfectness is rejected if and only if more than 4 heads are obtained. Obtain the

[6]

- critical region
- probability of type I error
- probability of type II error, when the corresponding probability of getting a head is 0.4.

b.

For the following fuzzy sets A and B, find the fuzzy cardinality of  $\overline{A \cup B}$

[6]

$$A = \left\{ \frac{0.4}{x_1} + \frac{0.7}{x_2} + \frac{0.5}{x_3} + \frac{0.6}{x_4} + \frac{0.7}{x_5} \right\}, \quad B = \left\{ \frac{0.3}{x_1} + \frac{0.5}{x_2} + \frac{0.8}{x_3} + \frac{0.2}{x_4} + \frac{1}{x_5} \right\}$$

## 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] (1154) B.Tech. CBCS (86160) Probability & Statistics Part 2 SEM 3