Seat No.

MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Probability & Statistics

Sub. Code: 86160

Day and Date: Thursday ,14-05-2026 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
2. Figures to the right indicate full marks
3. Use of Scientific calculator is allowed

Special Inst.: 1. Attempt any three questions from Q.1 to Q.4.
2. Attempt any three questions from Q.5 to Q.8.

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Q1) **[12]**

a) Find the mean and median for the following data. [6]

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	6	5	8	15	7	6	3

b) Find Quartile deviation for the following data. [6]

Class Interval	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40
Frequency	5	6	15	10	5	4	4

Q2) a) Calculate the coefficient of correlation between x and y for the following data. [5] **[11]**

x	2	4	6	8	10
y	5	7	9	8	11

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

x	10	12	13	16	17	20	25
y	19	22	24	27	29	33	37

Q3) a) If the mean of the Binomial distribution is 4 and the variance is 2 . Find the probability of less than two successes. [5] **[11]**

b) The hourly wages of 1000 workers are normally distributed around a mean of Rs. 70 and with a standard deviation of Rs. 5. Find the number of workers having hourly wages will be (i) between Rs. 69 and Rs. 72 (ii) more than Rs. 75. [6]

[Given: For S.N.V. z area from $z = 0$ to $z = 1$ is 0.3413, from $z = 0$ to $z = 0.2$ is 0.0793 and from $z = 0$ to $z = 0.4$ is 0.1554]

Q4)

a) Fit the curve $y= ab^x$ to the following data. [6] **[12]**

x	2	3	4	5	6
y	144	172.8	207.4	248.8	298.5

b) A manufacturer knows that the condensers he makes contain on an average 1% defectives. He packs them in boxes of 100. What is the probability that a box picked at random will contain 3 or more faulty condensers? [6]

Q5) a) In a random sample of 400 persons from a large population ,120 are females. Can it be said that males and females are in the ratio 5:3 in the population? Use 1% level of significance. [6] **[12]**

b) It is claimed that a random sample of 100 tyres with a mean life of 15261 kms is drawn from a population of tyres which has a mean life of 15200 kms and a standard deviation of 1242 kms. Test the validity of the claim at 5% level and 1% level of significance? [6]

Q6) a) If the fuzzy sets A and B are defined by [6] **[11]**

$$A = \frac{0.6}{x_1} + \frac{0.8}{x_2} + \frac{0.4}{x_3} + \frac{0.5}{x_4} + \frac{0.7}{x_5}, \quad B = \frac{0.8}{x_1} + \frac{0.7}{x_2} + \frac{05}{x_3} + \frac{0.2}{x_4} + \frac{0.6}{x_5}$$

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

b) For the fuzzy set defined by [5]

$$A(x) = \frac{x}{x+1}, \qquad x \in \{0,1,2,3,4,5\}$$

Find the fuzzy cardinality of A

Q7) Solve the following minimal assignment problem. [11] **[11]**

	A	B	C	D	E
I	11	17	8	16	20
II	9	7	12	6	15
III	13	16	15	12	16
IV	21	24	17	28	26
V	14	10	12	11	13

Q8) a) In order to test whether a coin is perfect, it is tossed 5 times. The null hypothesis of perfectness is accepted if and only if atmost 3 heads are obtained. Obtain the [6] **[12]**

(i) critical region

(ii) probability of type I error

(iii) 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 S(A, B) and S(B,A). [6]

$$A = \left\{\frac{0.1}{x_1} + \frac{0.2}{x_2} + \frac{0.3}{x_3} + \frac{0.9}{x_4} + \frac{0.6}{x_5}\right\}, \quad B = \left\{\frac{0.7}{x_1} + \frac{0.5}{x_2} + \frac{0.1}{x_3} + \frac{0.9}{x_4} + \frac{0.3}{x_5}\right\}$$

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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.
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1] (1154) B.Tech. CBCS (86160) Probability & Statistics Part 2 SEM 3

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