Seat No.

OCT-NOV 2025 WINTER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Applied Mathematics

Sub. Code: 63524/73276

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 calculator is allowed.

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

a. Fit a straight line to the following data: **[6]**

x	1	2	3	4	5	6	7	8
y	1	3	5	10	6	4	2	1

b. Fit a curve of the type $y = a\,x^b$ to the following data by method of least squares. **[6]**

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

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

a. It is 1 in 1000 that an article is defective. There are in a box 100 articles of these type .Assuming Poisson's distribution, find the probability that the box contains: **[5]**

(i) No defective (ii) Two or more defective

b. 10% bolts produced by a machine are defective. Determine the probability that out of 10 bolts chosen at random there will be i) one , ii) at most 2 iii) at least 2 defective **[6]**

Q3) **[11]**

a.

18269 2

Evaluate $\int_0^{0.6} e^{x^2}\,dx$ using Trapezoidal rule by taking $n = 6$. **[5]**

b. Evaluate: $\int_{0.2}^{1.4}(\sin x - \log x + e^x)\,dx$ using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule using six equal sub-intervals. **[6]**

Q4) Attempt any **Two** from the following. **[12]**

a. Find equations of line of regression y on x for the following data: **[6]**

x	91	97	108	121	67	124	51	73	111	57
y	71	75	69	97	70	91	39	61	80	47

b. The lifetime of certain type of battery has mean life of 400 hours and a standard deviation is 50 hours. Assuming the distribution of lifetime to be normal, find **[6]**

i) The percentage of batteries which have lifetime of more than 350 hours

ii) The percentage of batteries which have lifetime between 300 hours and 500 hours.

[Given S.N. V. Z. are between z = 0 and z = 1 is 0.3413, between z =0 and z = 2 is 0.4772]

c. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Weddle's rule by dividing the interval into 6 equal sub intervals. **[6]**

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

a. Define i) Scalar Cardinality of a fuzzy set **[6]**

ii) Union of two fuzzy sets

iii) Compliment of a fuzzy set

b. Let the fuzzy sets A *and* B be defined on the same universal set X by **[6]**

$A(x) = \frac{x}{x+2}$, $B(x) = \frac{x}{x+5}$, $x \in \{0,1,2,3, \ldots \ldots 10\}$.

Find i) $S(A,B)$ ii) $S(B,A)$

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

18269

a. Define fuzzy number. Determine whether the following fuzzy set is a fuzzy number. **[5]**

$$A(x) = \begin{cases} sinx\,, 0 \le x \le \pi \\ 0, \ otherwise \end{cases}$$

b. Find A+B from the following fuzzy numbers **[6]**

$$A(x) = \begin{cases} \frac{x+2}{2}, & -2 \le x \le 0 \\ \frac{2-x}{2}, & 0 \le x \le 2 \\ 0\ , & otherwise \end{cases}$$

$$B(x) = \begin{cases} \frac{x-2}{2}, & 2 \le x \le 4 \\ \frac{6-x}{2}, & 4 \le x \le 6 \\ 0\ , & otherwise \end{cases}$$

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

	I	II	III	IV	V
A	7	9	10	8	14
B	10	6	9	12	8
C	11	8	7	9	12
D	12	15	10	14	13
E	10	8	12	11	14

Q8) Attempt any **Two** from the following. **[12]**

a. **[6]**

$$\text{If } A = \frac{0.1}{1} + \frac{0.5}{2} + \frac{0.8}{3} + \frac{1}{4} + \frac{0.7}{5} + \frac{0.4}{6} + \frac{0.2}{7} + \frac{0}{8}\ ,$$

$$B = \frac{1}{1} + \frac{0.8}{2} + \frac{0.4}{3} + \frac{0}{4} + \frac{0.3}{5} + \frac{0.6}{6} + \frac{0.9}{7} + \frac{1}{8}$$

Find $^{0.5+}(A \cup \bar{B})$, $^{0.5+}(A \cap \bar{B})$

b. **[6]**

$$\text{If } A = \frac{0.2}{[0,1)} + \frac{0.6}{[1,2)} + \frac{0.8}{[2,3)} + \frac{0.9}{[3,4)} + \frac{1}{4} + \frac{0.5}{(4,5]} + \frac{0.1}{(5,6]},$$

$$B = \frac{0.1}{[0,1)} + \frac{0.2}{[1,2)} + \frac{0.6}{[2,3)} + \frac{0.7}{[3,4)} + \frac{0.8}{[4,5)} + \frac{0.9}{[5,6)} + \frac{1}{6} + \frac{0.5}{(6,7]} + \frac{0.4}{(7,8]} + \frac{0.2}{(8,9]} + \frac{0.1}{(9,10]}$$

Solve the equation A+X = B for X

c.

182692

Solve the following minimal assignment problem

	L	M	N	O	P
A	6	5	8	11	16
B	1	13	16	1	1
C	16	11	8	8	8
D	9	14	12	10	16
E	10	13	11	8	16

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 (73276) Applied Mathematics Part 2 SEM 3

2] (101) Bachelor of Engineering (63524) Applied Mathematics Part 2 SEM 3

182692