

Instructions:

- All Question are compulsory.
- Figure to the right indicate full marks.
- Draw neat diagrams wherever necessary.
- Make suitable assumptions wherever necessary and mention it clearly in answer book.
- Figures to left indicate Bloom's Taxonomy (BL) and Course Outcome [CO].

		Q. No.		Mar ks
BT	CO's	Q.1	All Questions are compulsory.	20

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| 1 | C210.1 | a | The mean weight of 150 students in a certain class of 60kgs. The mean weight of the boys is 70kgs. and that of the girls is 55 kgs. Find the number of boys and girls. | 6M |
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| 2 | C210.2 | b | In an investigation into the health and nutrition of two groups of children of different social status the following results are obtained. | 7 M |
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Health	Social Status		
	Poor	Rich	Total
Below Normal	130	20	150
Normal	102	108	210
Above Normal	24	96	120
Total	256	224	480

Test whether there is any relation between health and social issue. (Level of significance is 0.5).

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| 3 | C210.3 | c | Ten students got the following percentage of marks in Economics and Statistics. | 7 M |
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Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in Economics	78	36	98	25	75	82	90	62	65	39
Marks in statistics	84	51	91	60	68	62	86	58	53	47

Calculate correlation of coefficient.

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| | | Q.2 | All Questions are compulsory. | 10 |
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| 2 | C210.4 | a | A function $f(x)$ defined as follows | 4 |
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$$f(x) = \begin{cases} 0 & x < 2 \\ \frac{1}{18}(2x + 3) & 2 \leq x \leq 4 \\ 0 & x > 4 \end{cases}$$

Show that it is a probability density function.

- 3 C210.4 b If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals
- Exactly 3
 - More than 2 individuals
 - None
 - More than one individuals will suffer a bad reaction.

Q.3 All Questions are compulsory. 10

- 1 C210.5 a Find α cuts and strong α cuts of
- $$A(x) = \frac{x}{x+1}, X = \{0, 1, 2, \dots, 10\} \text{ for } 0.2, 0.4$$

- 1 C210.5 b If the fuzzy sets C and D defined by the following membership function
- $$C = \frac{0.1}{x_1} + \frac{0.6}{x_2} + \frac{0.8}{x_3} + \frac{0.9}{x_4} + \frac{0.7}{x_5} + \frac{0.1}{x_6}, D = \frac{0.9}{x_1} + \frac{0.7}{x_2} + \frac{0.5}{x_3} + \frac{0.2}{x_4} + \frac{0.1}{x_5} + \frac{0}{x_6}$$
- Find i) \bar{C} ii) \bar{D} iii) $\bar{C} \cap D$ iv) $C \cup D$ vi) $C \cup \bar{D}$ vii) $C \cup \bar{C}$ viii) $C \cap D$

Q.4 Attempt any two out of three questions 10

- 1 C210.6 a Find the fuzzy cardinality of the fuzzy set given by
- $$A(x) = \frac{35-x}{15} \text{ on } x = \{20, 22, 24, 26, 28, 30, 32, 34\}$$

- 1 C210.6 b For the fuzzy sets defined by $A(x) = \frac{x}{x+2}, B(x) = 2^{-x}$, $X = \{0, 1, 2, 3, 4, 5\}$. Find $S(|\bar{A}||\bar{B}|), S(|\bar{B}||\bar{A}|)$.

- 1 C210.6 c Find the fuzzy numbers $A+B, B-A$ where

$$A(x) = \begin{cases} \frac{x+3}{3} & -3 < x \leq 0 \\ \frac{3-x}{3} & 0 < x \leq 3 \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad B(x) = \begin{cases} \frac{x-3}{3} & 3 < x \leq 6 \\ \frac{9-x}{3} & 0 < x \leq 9 \\ 0 & \text{otherwise} \end{cases}$$
