07XIMITSOC2823

Max Marks: 60

Instructions: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**

Q1	**Attempt any two questions.**	**12**
a.	What is hard and soft computing? Explain.	6
b.	List and explain all applications of soft computing with real time applications.	6
c.	Discuss the concept of classification and clustering.	6
d.	Write a short note on Bayesian Network.	6
Q2	**Attempt any two questions.**	**12**
a.	Implement OR function using McCulloch-Pits neuron (take binary data).	6
b.	What is Hebb learning? Explain.	6
c.	Write a short note on Learning factors of Back-Propagation Network.	6
d.	Implement AND function with bipolar inputs and targets using Adaline neural network.	6

X1	X2	T
-1	-1	-1
-1	1	-1
1	-1	-1
1	1	1

BUMBTGFFR

Q3	**Attempt any two questions.**	**12**
a.	Explain the algorithm of Kohonen Self-Organizing Feature Maps.	6
b.	Write a short note on Maxnet, Mexican Hat Net & Hamming Network.	6
c.	What is convolution Neural Networks? Explain the Architecture of CNN.	6
d.	Explain Learning Vector Quantization.	6
Q4	**Attempt any two questions.**	**12**
a.	Explain fuzzy sets and different operations on fuzzy sets.	6
b.	Two fuzzy relations are given by	6

$$R = \begin{array}{c} \\ x_1 \\ x_2 \end{array}\begin{array}{c} \begin{array}{cc} y_1 & y_2 \end{array} \\ \begin{bmatrix} 0.6 & 0.3 \\ 0.2 & 0.9 \end{bmatrix} \end{array} \quad \text{and} \quad S = \begin{array}{c} \\ y_1 \\ y_2 \end{array}\begin{array}{c} \begin{array}{ccc} z_1 & z_2 & z_3 \end{array} \\ \begin{bmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{bmatrix} \end{array}$$

Obtain the fuzzy relation T using max min composition.

c.	Explain membership functions and features of membership functions.	6

6 12 12 12 12

d. Consider two given fuzzy sets 6

$$B1 = \{\frac{1}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0}{3.0}\} \quad \&. \quad B2 = \{\frac{1}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0}{3.0}\}$$

Find:

1. $B1 \cup B2$
2. $B1 \cap B2$
3. $B1 \cap \overline{B1}$
4. $B2 \cup \overline{B2}$
5. $A1|B2$
6. $\overline{B1 \cap B2}$

Q5 Attempt any two questions. **12**

a. Consider two fuzzy sets A & B, both defined on X Given as follows: 6

$\mu(x\,X)$	X1	X2	X3	X4	X5
A	0.2	0.3	0.4	0.7	0.1
B	0.4	0.5	0.6	0.8	0.9

Express the following $\propto -cut$

7. $(\overline{A})_{0.7}$
8. $(\overline{B})_{0.2}$
9. $(A \cup B)_{0.6}$
10. $(A \cap B)_{0.5}$
11. $(\overline{A} \cup \overline{B})_{0.8}$
12. $\overline{(A \cap B)}_{0.6}$

b. List all defuzzification methods. Explain any three. 6

c. What is selection? Explain different methods of selection. 6

d. Write a short note on mutation. 6

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