

M.C.A. Sem - V (Choice Based Credit System 2011 & 2012 Course) :
SUMMER - 2019
SUBJECT : SOFT COMPUTING

Day : Monday
Date : 15/04/2019

Time : 02.00 PM TO 05.00 PM
Max. Marks : 100

S-2019-2177

N.B.

- 1) Attempt **ANY FOUR** questions from Section – I and **ANY TWO** questions from Section – II.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Answer to both the section should be written in '**SAME**' answer books.

SECTION – I

- Q.1** Explain auto associative memory and hetro-associative memory model. **(15)**
- Q.2** a) Differentiate between fuzzy set and crisp set. **(07)**
b) Explain different properties of fuzzy set. **(08)**
- Q.3** Explain neural network architecture with suitable diagram. **(15)**
- Q.4** a) Explain selection and mutation operator with example. **(08)**
b) Explain indiscernibility relation with example. **(07)**
- Q.5** Explain working principle of GA and draw a flow chart of GA. **(15)**
- Q.6** a) Write a note on rough set theory. **(08)**
b) Explain different fuzzy connections. **(07)**

SECTION – II

- Q.7** Consider a set $P = \{P1, P2, P3, P4\}$ of four varieties of paddy plants, set $D = \{D1, D2, D3, D4\}$ of the various diseases affecting the plants and $S = \{S1, S2, S3, S4\}$ be the common symptoms of the diseases. **(20)**
Let \tilde{R} be a relation on $P \times D$ and
 \tilde{S} be a relation on $D \times S$

For,

$$\tilde{R} = \begin{matrix} & D1 & D2 & D3 & D4 \\ P1 & [0.6 & 0.6 & 0.9 & 0.8] \\ P2 & [0.1 & 0.2 & 0.9 & 0.8] \\ P3 & [0.9 & 0.3 & 0.4 & 0.8] \\ P4 & [0.9 & 0.8 & 0.1 & 0.2] \end{matrix} \quad \tilde{S} = \begin{matrix} & S1 & S2 & S3 & S4 \\ D1 & [0.1 & 0.2 & 0.7 & 0.9] \\ D2 & [1 & 1 & 0.4 & 0.6] \\ D3 & [0 & 0 & 0.5 & 0.9] \\ D4 & [0.9 & 1 & 0.8 & 0.2] \end{matrix}$$

Obtain the association of the plants with the different symptoms of the diseases using MAX-MIN composition.

Q.8 For the given activation function for ANN node

$$f(x) = \begin{cases} 0 & \text{if } x < -3 \\ \frac{x+3}{6} & \text{otherwise} \\ 1 & \text{if } x > 3 \end{cases}$$

a) Draw a neat visualization (sketch) and show that it is continuous. (15)

b) Find the value of input for which output will be exactly 0.5. (05)

Q.9 Consider the following fuzzy sets over universal set

$$X = \{1, 2, 3, 4, 5\}$$

Membership for Set A = $\{(1, 0), (2, 0), (3, 0.9), (4, 0.9), (5, 1.0)\}$

Set B = $\{(1, 0.57), (2, 0.3), (3, 0.8), (4, 0.5), (5, 1.0)\}$

Set C = $\{(1, 1), (2, 0), (3, 1), (4, 1), (5, 0.5)\}$

Find

a) $A^c \cup B$ (05)

b) $A \cap B$ (05)

c) $A \cap B \cap C$ (05)

d) $A^c \cap B^c$ (05)

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