IANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH. COMPUTER SCIENCE AND ENGINEERING MAKEUP EXAMINATIONS, DEC 2019

SUBJECT: SOFT COMPUTING PARADIGMS (CSE 4031)

REVISED CREDIT SYSTEM (28-12-2019)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitably assumed.
- 1A. Give the McCulloh's Pitt's definition of neural network. Explain the properties and capabilities of a neural network?5M
- **1B.** Explain the working of Reinforcement Learning and Unsupervised Learning model. **5M**
- 2A. Prove that for any two linearly separable classes there is a solution weight vector W0 5M after at most n_{max} iterations given by

$$n_{max} = \frac{\beta \|w_0\|^2}{\alpha^2}$$

where α and β are positive constants.

- 2B. With the help of signal flow graph, derive the weight updating equation of output neuron connected to hidden neuron j.5M
- 3A. Use the back propagation algorithm for computing a set of synaptic weights and bias since the set of a neural network to solve the XOR problem. Assume the use of a logistic function for the non-linearity.
- **3B.** Explain the energy minimization of a discrete Hopfield network. Also explain with example spurious state. **5M**
- **4A.** Explain with a neat diagram learning vector quantization.
- **4B.** Consider two fuzzy sets given by, $A = \left\{ \frac{1}{low} + \frac{0.2}{medium} + \frac{0.5}{high} \right\} \qquad B = \left\{ \frac{0.9}{positive} + \frac{0.4}{zero} + \frac{0.9}{negative} \right\}$ a) Find the fuzzy relation for the Cartesian product of A and B i.e., R = A x B b) Introduce a fuzzy set C given by,

$$C = \left\{ \frac{0.1}{low} + \frac{0.2}{medium} + \frac{0.7}{high} \right\}$$

Find the relation between C and B using Cartesian product i.e., find $S = C \times B$

Page 1 of 2

4M

4M

c) Find C o R using max - min composition.d) Find C o S using max - min composition.

4C.	Explain with an example intuition and inference methods for assigning membership	2M
	values.	

5A. Explain three main operators in Genetic algorithm and its effects.	5M
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⁵B. What is the need for defuzzification process? How lambda-cuts for fuzzy sets and fuzzy **5M** relations can be carried out.