



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **199323**

Roll No.

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B. Tech.

(SEM. III) (ODD SEM.) THEORY
EXAMINATION, 2014-15

INTRODUCTION TO SOFTCOMPUTING

Time : 3 Hours]

[Total Marks : 100

1 Attempt any FOUR parts : **4×5=20**

- (a) Define softcomputing. What are the different learning paradigms ?
- (b) What is an activation function ? Explain its characteristics in neural network.
- (c) Discuss in detail operations and properties of fuzzy sets.
- (d) What are the operators involved in a simple genetic algorithm ? Explain each with example.
- (e) What is neural network architecture ? Explain logistic sigmoid function with example.

2 Attempt any FOUR parts of the following : **4×5=20**

- (a) What is the classification of training ? Explain supervised training.

(b) What are the different attributes of predicate logic? Using inference in predicate logic and prove following statement :

(i) All man are mortal.

(ii) Socrates is a man.

Prove : Socrates is mortal.

(c) Let $X = \{a, b, c, d\}$
 $Y = \{1, 2, 3, 4\}$

And $\tilde{A} = \{(a, 0) (b, 0.8) (c, 0.6) (d, 1)\}$

$\tilde{B} = \{(1, 0.2) (2, 1) (3, 0.8) (4, 0)\}$

$\tilde{C} = \{(1, 0) (2, 0.4) (3, 1) (4, 0.8)\}$

Determine the implication relation if X is \tilde{A} then Y is \tilde{B} .

(d) Consider $X = \{2, 4, 6, 8, 10\}$. Find its power set, cardinality and cardinality of power set.

(e) Define delta rule. Explain significance of delta rule in defining the weights.

3 Attempt any TWO parts : 10×2=20

(a) What is meant by genetic algorithm? Compare and contrast traditional algorithm and genetic algorithm.

(b) A neuron j receives inputs from other neurons whose activity levels are 10, -20, 4 and -2. The respective synaptic weights of the neurons are 0.8, 0.2, -1.0 and 0.9. Calculate the output of neuron j for the following situation

(1) The neuron is linear.

(2) The neuron is represented by McCulloch-Pitts model, defined as follows :

$$Y_k = \begin{cases} 1, & \text{if } V_k \geq 0 \\ 0, & \text{if } V_k < 0 \end{cases} \text{ where } V_k \text{ is the induced local field.}$$

- (c) State the drawbacks of single layer perceptron. Name a problem which cannot be solved by the above neural model.

4 Attempt any TWO parts : $10 \times 2 = 20$

- (a) What is meant by genetic algorithm ? Compare and contrast traditional algorithm and genetic algorithm.
- (b) Is it possible for a GA to generate an individual with maximum fitness without using mutation, but only single point crossover ? If so, give an example.
- (c) Explain the effect of selection, crossover and mutation in evolutionary computation.

5 Attempt any TWO parts : $10 \times 2 = 20$

- (a) Short notes :
- (1) Perceptron model.
 - (2) Unsupervised and Supervised learning.
 - (3) Associative memory.
- (b) Discuss crossover operation in Genetic algorithm and its type.
- (c) Explain Fuzz inference system (FIS).