

Printed Pages : 4



NOE041

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

**PAPER ID :199431**

Roll No.

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### B. Tech.

(SEM. IV) THEORY EXAMINATION 2014-15  
INTRODUCTION TO SOFT COMPUTING (NEURAL NETWORK,  
FUZZY LOGIC & GENETIC ALGORITHM)

Time : 3 Hours]

[Total Marks : 100

1 Attempt **Five** Questions. **5x4=20**

- 1 Define fuzzification and defuzzification with example.
- 2 What is ADALINE?
- 3 What are the Three technology involved in Artificial Intelligence?
- 4 What are the fundamental building blocks of the biological neural network? Discuss.
- 5 Define fuzzy if then rules with suitable examples.
- 6 What is reinforcement learning? Discuss basic difference between learning factors or classifications.

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[ Contd...

**2 Attempt any four. 4x5=20**

- 1 Define structure of human brain with the help of neuron structure.
- 2 What are the characteristics of Neural Network?
- 3 How linear separable task is defined for two dimensional spaces and Discuss XOR problem?
- 4 Write note on:-  
Partition and covering.
- 5 Verify De Morgan's Law using truth table (For 3 states).
- 6 Discuss the basic fuzzy set operations.

**3 Attempt any Two. 10x2=20**

- (i) Consider the fuzzy sets A and B defined on the interval  $X = [0,5]$  of real numbers by the membership grade functions

$$\mu_A(x) = \frac{x}{x+1}, \mu_B(x) = 2^{-x}.$$

Determine the mathematical formulae and graphs of the membership grade functions of each of the following sets

- (a)  $A^c, B^c$
- (b)  $A \cup B$
- (c)  $A \cap B$
- (d)  $(A \cup B)^c$

- (ii) The task is to recognize English alphabetical characters (F, E, X, Y, I, T) in an image processing system.

Define two Fuzzy Sets I and F to represent the identification of characters I and F.

$$I = \{(F, 0.4), (E, 0.3), (X, 0.1), (Y, 0.1), (I, 0.9), (T, 0.8)\}$$

$$F = \{(F, 0.99), (E, 0.8), (X, 0.1), (Y, 0.2), (I, 0.5), (T, 0.5)\}$$

Find the following:

A) (I)  $I \cup F$  (II)  $I - F$  (III)  $F \cup F^c$

B) Verify De Morgan's Law

$$(I \cup F)^c = I^c \cap F^c$$

- (iii) Given

(i)  $C \vee D$

(ii)  $\sim H \Rightarrow (A \wedge \sim B)$

(iii)  $(C \vee d) \Rightarrow \sim H$

(iv)  $(A \wedge \sim B) \Rightarrow (R \vee S)$

Can  $(R \vee S)$  be inferred from inference rules?

**4** Attempt any **Two**. **10x2=20**

- 1 Derive an activation function for thresholding function.
- 2 Give Artificial Neural Network Architecture?  
What is Rosenblatt's perceptron model?

- 3 (a) Explain different methods of selection in genetic algorithm in order to select a population for next generation.
- (b) Give the detail of genetic representation (Encoding)

**5** Attempt any **Two**. **10x2=20**

- 1 Discuss the different applications of Genetic algorithms.
- 2 (a) Draw Flow chart and genetics cycle for Genetic Algorithm.
- (b) Define the basic concept of genetic algorithm.
- 3 (a) Discuss different genetic operators.
- (b) Explain Back propagation learning algorithm in detail.
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