Printed Pages : 1 **Roll No.** | | | | | | | | | | | **MTCS-031**

M. TECH.

THEORY EXAMINATION (SEM–II) 2016-17

MACHINE LEARNING

Time : 3 Hours ***Max. Marks : 70***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION- A

1. Attempt all parts of this section: **7×2=14**

(a) Explain the various types of issues in machine earning.

(b) Describe the Artificial Neural Networks (ANN).

(c) Define the learning classifiers.

(d) Differentiated between Bayesian Learning and Instance based Learning.

(e) Discuss the complexity of in finite hypothesis spaces.

(f) Write the at least five applications of machine learning.

(g) Discuss the regression model.

SECTION- B

2. Attempt any three parts of the following: **3×7=21**

(a) What is a core point in DBSCAN? What role do core points play in forming clusters?

(b) What objective function do regression trees minimize?

(c) What is the task of the E-step of the EM-algorithm? Give a verbal description (and not (just) formulas) how EM accomplishes the task of the E-step.

(d) EM uses a mixture of *k* Gaussian for clustering; what purpose does the k Gaussian serve?

(e) Describe brain-in-a box model. Compare with it a recurrent network.

SECTION- C

3. Attempt all questions in this section: **5×7=35**

(a) What is learning? Write any four learning techniques and in each case give the expression for weight- updating.

OR

Discuss various Artificial Neural Network Architectures.

(b) Explain back propagation algorithm and derive expressions for weight update relations.

OR

With help of a suitable diagram discuss functioning of a simple artificial neuron. Explain how the functionality affected if two such neuron are connected in series.

(c) Define gradient. Using steepest descent rule to the following function

$$f(x) = x_1^2 + 5x_1x_2 + 10x_2^2$$

Determine first three points of trajectory starting from

$$x_0 = [0.5, 0.5]$$

OR

Write an algorithm to implement simulated annealing.

(d) Explain Perceptron training algorithm for linear classification. And explain its equation using homogeneous coordinates.

OR

Explain geometric models and probabilistic models of machine learning with suitable examples.

(e) What are neighbors? Why is it necessary to use nearest neighbor while classifying justify the answer with suitable example.

OR

Explain how genetic algorithms are influenced by knowledge based techniques. Also discuss the how Genetic Algorithm is different from traditional algorithms?