

Roll Number:

**Thapar University Patiala**  
**Computer Science and Engineering Department**  
**End Semester Examination (May 21, 2015)**

**ME-I<sup>st</sup> Year (Computer Science and Engineering)**  
**(II Semester)**

**PCS-206 Machine Learning**

**Time: 3Hours; MM:40**

**Name of Faculty: Dr. V. P. Singh**

**Note: All questions are compulsory & Attempt in SEQUENTIAL ORDER**

Q1. a. Find which attribute acts as a root of a tree, based on one of the decision tree learning algorithm for a given data below

Example	Attributes			Goal Play Tennis
	Outlook	Humidity	Wind	
D1	Sunny	High	Weak	No
D2	Sunny	High	Strong	No
D3	Cloudy	High	Weak	Yes
D4	Rainy	High	Weak	Yes
D5	Rainy	Normal	Weak	Yes
D6	Rainy	Normal	Strong	No
D7	Cloudy	Normal	Strong	No
D8	Sunny	High	Weak	No
D9	Sunny	Normal	Weak	Yes
D10	Rainy	Normal	Weak	Yes
D11	Cloudy	High	Strong	No
D12	Rainy	High	Strong	No

b. Explain the advantages of converting the decision tree to rules before pruning. (4, 2)

Q2. a. A particular problem has the training sets as given in the table below with  $\eta=0.5, \lambda=1$ , initial weight vectors are  $V=[0.1 \ -0.2 \ 0.4 \ 0.2]$  at the input layer and  $W=[0.2 \ -0.5]$  at the output layer. Training the neural network using error back-propagation model and calculate new values of weights. Assume two neurons are in the hidden layers.

Inputs		Output
I1	I2	
0.3	-0.5	0.05
0.6	-0.1	0.3

P.T.O.

- b. What is importance of momentum and learning constant in error back-propagation learning algorithm? Explain. (5, 3)

Q3. a. Explain the multicategory continuous perceptron training algorithm in detail.

- b. Explain the architecture of discrete Hopfield network. (3, 3)

Q4. a. Explain the working principle of Genetic Algorithm (GA). What is encoding in Genetic Algorithm (GA)? Explain its any three different types.

- b. What are the capabilities and limitations of the explanation-based learning? (4, 3)

Q5. a. What is bayesian belief network? Explain gradient ascent rule for training the Bayesian networks.

- b. Explain the First-Order rule- FOIL algorithm for learning sets of rules. (4, 3)

Q6. a. Explain the architecture of knowledge-based ANN (KBANN) for inductive-analytical learning.

- b. What are the assumptions for formulation of the problems using inductive and analytical learning? (4, 2)

**Note: Students advised to see their evaluated answer sheet on 26/5/2012: 12.10 P.M. at Room No. B208**