Seat No.:_____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– V• EXAMINATION – WINTER 2020

Subject Code:3650014 **Date:06/01/2020**

Subject Name:Machine Learning

Time:10:30 AM to 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Answer the following questions: **03**

1) What is regression?
2) What do you mean by unsupervised learning?
3) How do machine learn?

(b) Give the comparison among supervised, unsupervised and reinforcement learning. **04**

(c) Explain the different issues in machine learning. **07**

Q.2 **(a)** Relate Inductive bias with respect to Decision tree learning. **03**

(b) What are the advantages and disadvantages of the K-nearest neighbor learning? **04**

(c) Explain the concept of regression in machine learning. **07**

Q.3 **(a)** What do you mean by Recommender System? **03**

(b) Explain Locally Weighted Linear Regression. **04**

(c) Give decision tree for the following set of training examples. **07**

Day	Outlook	Temperature	Humidity	Wind	Play_Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Q.4 **(a)** Define Concept and Concept Learning. **03**

(b) Is it possible to use Naïve Bayes classifier for continues numeric data? If so how? **04**

(c) Consider the following set of training examples. **07**

1) What is the entropy of this collection of training example with respect to the target function classification?

2) What is the information gain of a_2 relative to these training examples?

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

Q.5 **(a)** What is linearly inseparable problem? What is the role of the hidden layer? **03**

(b) What are the types of problems in which Artificial Neural Network can be applied? **04**

(c) What is Cost function in BackPropagation? Discuss Back propagation algorithm. **07**

Q.6 **(a)** What is artificial neural network (ANN)? **03**

(b) Under what conditions the perceptron rule fails and it becomes necessary to apply the delta rule. **04**

(c) Explain the Bayesian Belief Network with suitable example in detail. **07**

Q.7 **(a)** Define (i) Prior Probability (ii) Conditional Probability (iii) Posterior Probability. **03**

(b) Explain the Gradient Search to Maximize Likelihood in a neural Net. **04**

(c) Explain Bayesian belief network and conditional independence with example. **07**

Q.8 **(a)** Define Bayesian theorem? What is the relevance and features of Bayesian theorem? **03**

(b) Discuss Maximum Likelihood and Least Square Error Hypothesis. **04**

(c) Explain the concept of EM Algorithm. Discuss what the Gaussian Mixtures are? **07**

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