Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**MCA – SEMESTER V - EXAMINATION –SUMMER-2021**

**Subject Code: 3650014 Date: 07-08-2021**

**Subject Name: Machine Learning (ML)**

**Time: 02:30 PM to 05:00 PM Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make Suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

**Q-1 (a) Select the most appropriate answer:** **[07]**

1. A hypothesis h is consistent with a set of training examples D if and only if
   (a) h(x) = c(x)
   (b) c(x) = 1
   (c) h(x) = 1
   (d) None of the above

2 Which of the following Boolean functions cannot be represented using perceptrons ?
   (a) AND
   (b) NAND
   (c) OR
   (d) XOR

3. The most general hypothesis-that every day is a positive example-is represented by _____.
4. The most specific possible hypothesis- that no day is a positive example–is represented by : _____.
5. The concept or function to be learned is called the _____, which we denote by **c**.
6. One type of **ANN** system is based on a unit called _____.
7. The set of items over which the concept is defined is called _____, which we denote by **X.**

**(b) Fill in the blanks** : **[07]**

1. A set of hypotheses consistent with the training examples is termed as _____.
2. Any hypothesis that maximizes the probability P**(D/h)** is called _____.
3. **ID3** algorithm uses a statistical test for classification called _____.
4. _____ determines the kind of training experience used by a particular learning problem.
5. **BPNN** stands for _____.
6. **FOCL** stands for _____.
7. In Case Based Reasoning **(CBR**), each instance is represented by its ____ and _____.

Q-2 (a) Define Machine Learning and Learning Problems. What is a well-defined learning problem ? Explain it with an example. **[07]**

(b) What is decision tree ? Explain various issues in the Decision Tree Learning. **[07]**

**[OR]**

(b) What is a General-to-Specific Ordering ? How this concept is used in Candidate Elimination algorithm ? Explain in detail. **[07]**

Q-3 (a) What is decision tree ? Explain various issues in the Decision Tree Learning ? **[07]**

(b) When we can consider Neural Networks ? Give an examples of an application using Neural Networks. **[07]**

**[OR]**

Q-3 (a) Discuss Backpropagation algorithm in detail. **[07]**

(b) What is Perceptron ? Mention Perceptron training rules. **[07]**

Q-4 (a) Write a note on Root Mean Square Error and Information Gain. **[07]**

(b) Differentiate the following :

1. Gradient Descent and Stochastic Gradient Descent **[03]**
2. Confusion Matrix and MAP Hypothesis **[04]**

**[OR]**

Q-4 (a) Discuss **CART**. Explain with suitable example.. **[07]**

(b) Write a note on **Bayes Theorem**. . **[07]**

Q-5 (a) With a suitable example, explain **Face Recognition** using Machine Learning. **[07]**

(b) What is an inductive bias ? Is there any effect on classification due to bias ? **[07]**

**[OR]**

Q-5 (a) What is a **Recommender System** ? How Machine Learning is useful in **Recommender Systems** ? **[07]**

(b) Explain **Bayseian Belief Network** using and example. **[07]**

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