## **GUJARAT TECHNOLOGICAL UNIVERSITY** MCA INTEGRATED - SEMESTER-VII • EXAMINATION – WINTER - 2016

## Subject Code:4470601 Subject Name: Machine Learning Time:10.30 am to 01.00 pm Instructions:

Total Marks: 70

Date: 17/11/2016

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## ctions:

- 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:
  - (1) Which of the following steps determine the type of training examples that will be referred by a program while designing a learning system?
    - (a) Choosing a training experience
    - (b) Choosing a target function
    - (c) Choosing a representation of the target function
    - (d) Choosing a function approximation algorithm
  - (2) 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
  - (3) Which of the following Boolean functions cannot be represented using perceptrons?
    - (a) AND
    - (b) NAND
    - (c) OR
    - (d) XOR
  - (4) If A = 0011 and B = 1010 then after applying crossover operator we get (a) A' = 0010 and B' = 1011
    - (b) A' = 0010 and B' = 1110
    - (c) A' = 0100 and B' = 1110
    - (d) A' = 1110 and B' = 0010
  - (5) Roulette Wheel Selection is another name for the method called
    - (a) Fitness Proportionate Selection
    - (b) Tournament Selection
    - (c) Rank Selection
    - (d) None of the above
  - (6) Which of the following probabilities indicate the confidence that the hypothesis h holds after the training data D has been observed?
    - (a) P(h)
    - (b) P(D)
    - (c) P(D|h)
    - (d) P(h|D)
  - (7) Which of the following literals does not contain any variables?
    - (a) Ground Literal
    - (b) Positive Literal
    - (c) Negative Literal
    - (d) None of the above
  - (**b**) Fill in the blanks:
    - (1) A set of all hypotheses consistent with the training example is termed as

- (2) ID3 algorithm uses a statistical test for classification called
- (3) \_\_\_\_\_ determines the kind of training experience used by a particular learning problem.
- (4) \_\_\_\_\_ and \_\_\_\_\_ are the two important operators used by Genetic Algorithm.
- (5) Any hypothesis that maximizes the probability P (D|h) is called \_\_\_\_\_
- (6) In Case Based Reasoning (CBR), each instance is represented by its \_\_\_\_\_\_ and \_\_\_\_\_.
- (7) FOCL stands for \_\_\_\_\_. (full-form)
- Q.2 (a) Define Machine Learning and Learning Problems. Explain the steps for 07 designing a learning system in detail.
  - (b) What is General-to-Specific Ordering? How this concept is used in Find-S 07 algorithm? Explain in detail.

OR

- (b) What is a Version Space? How this concept is used in Candidate Elimination 07 algorithm? Explain in detail.
- Q.3 (a) Design a learning system of your choice. Determine its task, performance 07 measure and training experience in detail.
  - (b) Discuss the concept of Inverted Resolution in detail.

## OR

**Q.3** (a) Consider the following data:

<u>Attributes</u>	Possible Values
Outlook	Sunny, Overcast, Rainy
Humidity	High, Normal
Wind	Strong, Weak
Temperature	High, Mild, Cool
PlayTennis	Yes, No

Based on this data, first represent them in the form of bit strings of your choice and then according to your representation, show how the following if-then rules can be represented (again in bit strings) :

- (1) IF Outlook = sunny THEN PlayTennis = no
- (2) IF Outlook = sunny AND Humidity = high THEN PlayTennis = no
- (3) IF Outlook = sunny AND Temperature = cool THEN PlayTennis = yes
- (4) IF Temperature = mild AND Humidity = low THEN PlayTennis = yes
- (5) IF Outlook = overcast OR rainy THEN PlayTennis = yes
- (6) IF Outlook = sunny OR rainy AND Humidity = high THEN PlayTennis = no
- (7) IF Outlook = rainy AND Temperature = mild OR cool THEN PlayTennis = yes
- (**b**) Differentiate the following:

(1) Inductive Learning and Analytical Learning	04	
(2) Gradient Descent and Stochastic Gradient Descent	03	
Discuss Backpropogation algorithm in detail.	07	
Write a note on Bayes Theorem.	07	

OR

Q.4 (a) Do as directed:

**Q.4** 

(a) (b)

- (1) List and explain the types of Genetic Operators in brief. 04
- (2) List and explain the types of Fitness Functions in brief. **03**

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	<b>(b)</b>	Discuss k-Nearest Neighbor algorithm in detail.	07
Q.5	(a)	Explain the working of CADET System using the concepts of Case Based Reasoning (CBR) algorithm.	07
	<b>(b)</b>	Describe Sequential Covering algorithm in detail.	07
		OR	
Q.5	<b>(a)</b>	Explain Bayesian Belief Network using an example.	07
-	<b>(b)</b>	Discuss the similarities and differences of FOIL and FOCL algorithm.	07
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