B.E. / B.Tech. DEGREE EXAMINATION, MAY

Fifth Semester

Electrical and Electronics Engineering

19UEE920- MACHINE LEARNING

(Common to ALL branches)

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1.	Application of machine learning methods to large databases is called			CO1 -R
	(a) data mining	(b)artificial intelligence	(c) big data computing	(d) internet of things
2.	In what type of learning labeled training data is used			CO1 -R
	(a)unsupervised learning	(b) supervised learning	(c)reinforcement learning	(d)active learning
3.	Regression trees are often used to be			CO2- R
	(a) Linear	(b) Non-linear	(c) Categorical	(d) Symmetrical
4	How do you choose the root node while constructing a Decision Tree?			CO2- R
	(a)attribute with high entropy	(b) high entropy and information gain	(c) largest information gain	(d) None of the mentioned
5	ID3 stands for			CO3- R
	(a)Induction Decision Tree	(b) Iterative Data base	(c)Iterative Dichotomiser	(d)Iterative Decision Tree
6	The output of training process in machine learning is			CO3- R

	(a)machine learning model	(b)machine learning algorithm	(c) null	(d) accuracy
7	You are given reviews of few netflix series marked as positive, negative and neutral. Classifying reviews of a new netflix series is an example of			CO4- App
	(a)supervised learning	(b)unsupervised learning	(c)semisupervised learning	(d) reinforcement learning
8	____finds the most specific hypothesis consistent with the training example			CO4- R
	(a) Find-S	(b) Rote-Learn	(c)Candidate Elimination	(d) All of these
9	Back propagation is a learning technique that adjusts weights in the neural network by propagating weight changes			CO5- R
	(a) Forward from source to sink	(b) Backward from sink to source	(c) Forward from source to hidden nodes	(d) Backward from sink to hidden nodes
10	The Bayes rule can be used in			CO5- R
	(a) Solving queries	(b)Increasing complexity	(c)Decreasing complexity	(d) Answering probabilistic query

PART – B (5 x 2= 10Marks)

11.	Define Machine Learning. Explain with examples why machine learning is important?	CO1- U
12.	Differentiate between Gradient Descent and Perceptron training rule.	CO2- U
13.	Explain Brute force Bayes Concept Learning.	CO3 -U
14.	Consider a medical diagnosis problem in which there are two alternative hypotheses: i. That the patient has a particular form of cancer (+) and	CO4 - App

	ii. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.			
15.	Explain the methods involved in learning disjunctive sets of rules.		CO5 -U	
	PART – C (5 x 16= 80Marks)			
16.	(a)	Explain the steps in designing learning systems in detail.	CO1 -U	(16)
		Or		
	(b)	Describe the procedure of building Decision tree using ID3 with Gain and Entropy. Illustrate with example.	CO1-U	(16)
17.	(a)	Write the final version space for the below-mentioned training example using the candidate elimination algorithm.	CO2 - App	(16)

Origin	**Manufacturer**	**Color**	**Decade**	**Type**	**Example Type**
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chryster	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive
Japan	Toyota	Green	1980	Economy	Positive
Japan	Honda	Red	1980	Economy	Negative

		Or			
	(b)	With the given data set, find B_0 and B_1 by using logistic Regression. When X = 6, find the value of Y.	CO2 - App	(16)	

X	1	2	4	3	5
Y	1	3	3	2	5

18.	(a)	Classify a set of 10 students in to two clusters based on the obtained marks and rank using appropriate method. (Analyze)	CO3 - Ana	(16)

Marks	99	59	97	87	86	77	67	57	47	40
Rank	1	7	2	3	4	5	6	8	9	10

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<tr><td></td><td>(b)</td><td>By using the fitness function as f(x) = 2x with the interval [0, 15], find the optimal solution using appropriate algorithm.</td><td>CO3-Ana</td><td>(16)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>19.</td><td>(a)</td><td>Derive an equation for MAP hypothesis using Bayes theorem and explain Maximum Likelihood Hypothesis for predicting probabilities.</td><td>CO4-Ana</td><td>(16)</td></tr>
<tr><td></td><td></td><td>Or</td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td>Consider the sample dataset mentioned below and calculate $\frac{\partial L}{\partial W1}$ by using back propagation algorithm. Assume 1. Your network has only one hidden layer. 2. All the weights are equal to 1 and all the bias are equal to 0.
<table>
<tr><th>Name</th><th>Weight (lb)</th><th>Height (in)</th><th>Gender</th></tr>
<tr><td>Alice</td><td>133</td><td>65</td><td>F</td></tr>
<tr><td>Bob</td><td>160</td><td>72</td><td>M</td></tr>
<tr><td>Charlie</td><td>152</td><td>70</td><td>M</td></tr>
<tr><td>Diana</td><td>120</td><td>60</td><td>F</td></tr>
</table></td><td>CO4-Ana</td><td>(16)</td></tr>
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<tr><td>20.</td><td>(a)</td><td>Draw the perceptron network with the notation. Derive an equation of gradient descent rule to minimize the error.</td><td>CO5-U</td><td>(16)</td></tr>
<tr><td></td><td></td><td>Or</td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td>Explain Q Learning and learning set of rules in FOIL.</td><td>CO5- U</td><td>(16)</td></tr>
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