USN											18CS62

B. E. Degree (Autonomous) Sixth Semester End Examination (SEE), June/July 2022

MACHINE LEARNING

(Model Question Paper - I)

[Time: 3 Hours] **[Maximum Marks: 100]**

Instructions to students:

1. **Answer any one from question number 1 and 2**
2. **Answer any one from question number 3 and 4**
3. **Answer any one from question number 5 and 6**
4. **Answer any one from question number 7 and 8**
5. **Answer any one from question number 9 and 10**

Q. No.		QUESTIONS	Marks	COs	RBT Level
1	A)	Define Machine Learning. Explain with examples why machine learning is important. Also Discuss some applications of machine learning with examples. Unit1 Page1	10M	CO1	L2
	B)	Discuss the following with respect to the above, Unit1 Page3 (i) Choosing the training experience. (ii) Choosing the target function and (iii) Choosing a function approximation algorithm	10M	CO1	L2
		OR			
2	A)	Write Candidate Elimination Algorithm. Apply the algorithm to obtain the final version spacefor the training example. Unit1 Page18	10M	CO2	L3
	B)	Explain in detail the inductive bias of Candidate Elimination Algorithm. Unit1 Page27	10M	CO2	L2
3	A)	Explain representation of decision tree with example. List the appropriate problems for Decision tree learning. Unit2 Page2-3	10M	CO2	L2
	B)	Write and explain decision tree for the following transactions: Assignment Question	10M	CO2	L3
		OR			

Sl. No.	Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoy sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

Tid	Refund	Martial status	Taxable Income	Cheat
1	Yes	Single	125 K	No
2	No	Married	100 K	No
3	No	Single	70 K	No
4	Yes	Married	120 K	No
5	No	Divorced	95 K	Yes
6	No	Married	60 K	No
7	Yes	Divorced	220 K	No
8	No	Single	85 K	Yes
9	No	Married	75 K	No
10	No	Single	90 K	Yes

<table>
<tr><td>4</td><td>A)</td><td>For the transactions shown in the table compute the following :
(i) Entropy of the collection of transaction records of the table with respect to classification.
(ii) What are the information gain of a_1 and a_2 relative to the transactions of the table? Unit2 Page33 Same Question but last three columns have been added to the existing question
<table>
<tr><th>Instance</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th></tr>
<tr><th>a_1</th><td>T</td><td>T</td><td>T</td><td>F</td><td>F</td><td>F</td><td>F</td><td>T</td><td>F</td></tr>
<tr><th>a_2</th><td>T</td><td>T</td><td>F</td><td>F</td><td>T</td><td>T</td><td>F</td><td>F</td><td>T</td></tr>
<tr><th>Target class</th><td>+</td><td>+</td><td>-</td><td>+</td><td>-</td><td>-</td><td>-</td><td>+</td><td>-</td></tr>
</table></td><td>8M</td><td>CO2</td><td>L3</td></tr>
<tr><td></td><td>B)</td><td>Describe the ID3 algorithm for decision tree learning. Unit2 Page4</td><td>8M</td><td>CO2</td><td>L2</td></tr>
<tr><td></td><td>C)</td><td>List the issues of decision tree learning. Unit2 Page20</td><td>4M</td><td>CO2</td><td>L2</td></tr>
<tr><td>5</td><td>A)</td><td>Explain MP neuron model with its architecture. Implement AND function using MP neuron. Unit3 Page91</td><td>10M</td><td>CO3</td><td>L3</td></tr>
<tr><td></td><td>B)</td><td>Using the Linear Separability concept, obtain the response for OR function. [Take bipolar Inputs and bipolar targets.] Unit3 Page116</td><td>10M</td><td>CO3</td><td>L3</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>6</td><td>A)</td><td>Implement OR function with binary inputs and bipolar targets using perceptron training algorithm upto 3 epochs. Unit3 Page175</td><td>10M</td><td>CO3</td><td>L3</td></tr>
<tr><td></td><td>B)</td><td>Explain backpropagation Network Architecture with training algorithm. Unit3 Page227</td><td>10M</td><td>CO3</td><td>L2</td></tr>
<tr><td>7</td><td>A)</td><td>i. Write Bayes theorem and maximum posterior hypothesis? Unit4 Page4
ii. Derive an equation for MAP hypothesis using Bayes theorem.</td><td>10M</td><td>CO3</td><td>L3</td></tr>
<tr><td></td><td>B)</td><td>Consider a football game between two rival teams: Team 0 and Team 1. Suppose Team 0 wins 95% of the time and Team 1 wins the remaining matches. Among the games won by team 0, only 30% of them come from playing on teams 1’s football field. On the otherhand, 75% of the victories for team 1 are obtained while playing at home. If team 1 is to host the next match between the two teams, which team will most likely emerge as the winner? Assignment Question</td><td>10M</td><td>CO3</td><td>L4</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>8</td><td>A)</td><td>Give the relationship between Bayes theorem and the problem of concept learning? Explain Brute-force MAP learning algorithm. Unit4 Page6</td><td>10M</td><td>CO2</td><td>L2</td></tr>
<tr><td></td><td>B)</td><td>The following table gives data set about stolen vehicles. Using Naïve bayes classifierclassify the new data (Red, SUV, Domestic)
Unit4 Page40
<table>
<tr><th>Color</th><th>Type</th><th>Origin</th><th>Stolen</th></tr>
<tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr>
<tr><td>Red</td><td>Sports</td><td>Domestic</td><td>No</td></tr>
<tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr>
<tr><td>Yellow</td><td>Sports</td><td>Domestic</td><td>No</td></tr>
<tr><td>Yellow</td><td>Sports</td><td>Imported</td><td>Yes</td></tr>
<tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>No</td></tr>
<tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>Yes</td></tr>
<tr><td>Yellow</td><td>SUV</td><td>Domestic</td><td>No</td></tr>
<tr><td>Red</td><td>SUV</td><td>Imported</td><td>No</td></tr>
<tr><td>Red</td><td>Sports</td><td>Imported</td><td>Yes</td></tr>
</table></td><td>10M</td><td>CO3</td><td>L3</td></tr>
</table>

9	**A)**	Write short notes on the following: (i)Estimating Hypothesis accuracy. (ii)Binomial distribution. Unit5 Page10 and 14	**10M**	**CO4**	**L2**
	B)	Explain the method of comparing two algorithms. Justify with paired to tests method Unit5 Page21	**10M**	**CO4**	**L3**
		OR			
10	**A)**	Explain the K-nearest neighbor Learning. Unit5 Page2	**5M**	**CO3**	**L2**
	B)	Explain locally weighted Regression. Unit5 Page5	**5M**	**CO4**	**L2**
	C)	Explain instance based learning? Unit5 Page1	**10M**	**CO4**	**L2**