

DEPARTMENT OF MECHATRONICS ENGINEERING VII SEMESTER B. TECH MECHATRONICS ENGINEERING <u>MAKE UP EXAM</u>

Subject: Machine Learning

Subject Code: MTE 4073

Date: 27/12/2022 Max Marks: 50

Important Note: Important Note: Make necessary assumption, if required

S. No.	Question	Μ	СО	PO	LO	BL
1A	Define linear regression and explain its various types. Also, illustrate the mathematical expression for the regression line.	5	CO2	2,5	2,3	5
1B	Explain following	3	CO1	1,2	1,2	5
	a. Supervised learning					
	b. Unsupervised Learning					
	c. Reinforcement Learning					
1C	Distinguish between ANN and traditional computing.	2	CO4	3,4	3,4	4
2A	Adapt the Naïve Bayes classifier for the classification based on the following information: Consider a football game between two rival teams, say team A and team B. Suppose team A wins 75% of the time and team B wins the remaining matches. Among the games won by team A, only 25% of them come from playing at team B's football field. On the other hand, 65% of the victories for team B are obtained while playing at home. a. If team B is to host the next match between the two teams, what is the probability that it will emerge as the winner? b. If team B is to host the next match between the two teams, who will emerge as the winner?	5	C03	3,5	3,6	6
2B	Discuss, why is the k-nearest neighbor's algorithm called "lazy learner"? Give 2 Practical usages of the k-nearest neighbor algorithm.	3	CO2	2,3	2,3	5
2C	List any four major advantages of neural network.	2	CO4	2,3	2,3	4
3A	Explain the functions of weight and biases in artificial neural network with a sketch.	4	CO4	4,5	3,4	4
3B	Explain overfitting in decision tree. How it can overfitting be avoided? Also discuss the triple trade-off in the decision tree.	3	CO2	2,3	2,5	5
3C	Determine the information gain for partitioning S at attribute A1 and Attribute A2 presented in figure 3C	3	CO2	1,2	1,2	5

	[29+,35-] <i>True</i> <i>True</i> <i>False</i> [21+, 5-] <i>False</i> [18+, 30-] <i>True</i> <i>False</i> [11+, 2-] <i>Figure 3C</i>					
4A	Explain the following terms for probability	4	CO2	2,3	2,5	5
	a. Marginal probability					
	b. Conditional probability					
4 B	Compare the artificial neuron and human biological neuron.	3	CO4	2,3	1,4	5
4 C	Explain following artificial neural network	3	CO4	1,2	1,2	5
	a. Feedforward					
	b. Feedforward backpropagation					
5A	Propose and elaborate the application of machine learning for the natural	4	CO4	3,5	3,6	6
	language processing.					
5B	Determine the support vectors and estimate the hyperplane using non	4	CO3	2,3	3,6	5
	Linear SVM for positively and negatively labelled data points $\binom{2}{2}, \binom{2}{2}, \binom{-2}{2}, \binom{-2}{2}$ and $\binom{1}{4}, \binom{1}{4}, \binom{-1}{4}, \binom{-1}{4}$ respectively.					
5C	Enlist and explain any three activation functions used in the artificial	2	CO4	2	2,3	5
	neural network.					