Roll No..... Enrolment No.....

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Department of Computer Science & Engineering

Supplementary Examination - 2023

Subject: Machine Learning

Subject Code: BTCSE - DED13 / BTCSEAI - 501

TIME: 3 Hours **MAX. MARKS: 75**

Note: 1) Immediately write your Roll No. and Enrolment No. after receiving the Question Paper.
2) Do not write anything on the Question Paper.
3) Scientific Calculator is allowed without Memory Feature.
4) Please follow proper numbering while answering the questions.

SECTION – A (35 Marks)

❖ ***Attempt ALL questions. Each question is of 5 marks.***

Q. No.	Questions	CO*	BL*
1.	What is Machine Learning? Explain, and List the applications of Machine Learning.	CO1	L1, L2
2.	Explain how Support Vector Machine can be used for classification of linearly separable data.	CO3	L4, L5
3.	Explain the concept of Probably Approximately Correct learning.	CO3	L4, L5
4.	Suppose 10000 patients get tested for flu; out of them, 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For the healthy people, the same test was positive for 180 and negative for 8820. Construct a confusion matrix for the data and compute the precision and recall for the data.	CO5	L3, L4, L5
5.	Differentiate between Artificial Neural Network and Convolutional Neural Network with examples.	CO2	L2, L3
6.	Explain the different methods that can be used to handle the missing values and outliers.	CO2	L2, L3
7.	Write an explanatory note on ensemble models.	CO1	L1, L2

SECTION – B (40 Marks)

❖ ***Attempt any FOUR questions. Each question is of 10 marks.***

Q. No.	Questions	CO*	BL*
1.	A patient takes a lab test and the result comes back positive. It is known that the test returns a correct positive result in only 98% of the cases and a correct negative result in only 97% of the cases. Furthermore, only 0.008 of the entire population has this disease. 1. What is the probability that this patient has cancer? 2. What is the probability that he does not have cancer? 3. What is the diagnosis?	CO5	L5, L6
2.	What is logistic regression? Explain, and derive all the gradient descent equation for this regression.	CO3	L3, L4

3.	Suppose, you have given the following data where X and Y are the 2 input variables and Class is the dependent variable. X: -1, 0, 0, 1, 1, 1, 2, 2 Y: 1, 1, 2, -1, 0, 2, 2, 3 Class: -, +, -, -, +, +, -, + Suppose, you want to predict the class of new data point X=1 and Y=1 using Euclidian distance in 5-NN. In which class this data point belongs to?	CO5	L3, L4, L5
4.	Compute the Principal Component of following data set: X=1, 0, -1, 1 and Y= -1, 1, 0, 1	CO4	L3, L4, L5
5.	Create the relationship model for the data given in table below and also predict Y for X1=3.2 and X2=1.5 respectively. Observations: 1, 2, 3, 4, 5 X1: 3.0, 3.1, 3.3, 3.5, 3.6 X2: 1.1, 1.3, 1.2, 1.0, 1.4 Y: 13, 14, 15, 10, 12	CO5	L3, L5, L6
6.	For the following set of training samples, find which attribute can be chosen as the root for decision tree classification. Instance: 1, 2, 3, 4, 5, 6 Classification: +, +, -, +, -, - A1: T, T, T, F, F, F A2: T, T, F, F, T, T	CO5	L4, L5, L

CO* - Course Outcomes from Syllabus, BL* - Bloom's Taxonomy Levels (1: Remembering, 2: Understanding, 3: Applying, 4: Analyzing, 5: Evaluating, 6: Creating)

END