BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH **SEMESTER : VI**
BRANCH: EEE **SESSION : SP2023**

SUBJECT: EE447 MACHINE LEARNING

TIME: 03 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

---

			CO	BL
Q.1(a)	Explain the candidate elimination algorithm in detail along with the steps involved in it with suitable example.	[5]	1,2	2,3
Q.1(b)	Explain the following terms with suitable examples: Overfitting, Underfitting and cross validation of data.	[5]	1,2	1,2
Q.2(a)	Explain the following concepts with suitable examples: Bayes theorem, maximum posterior hypothesis, maximum likelihood estimation.	[5]	2	1,2
Q.2(b)	For the transection shown in the table compute (a) entropy of the collection of transection records of the table with respect to classification (b) information gain of a1 and a2.	[5]	3,4	4,5

Instance	1	2	3	4	5	6	7	8	9
a1	T	T	T	F	F	F	F	T	F
a2	T	T	F	F	T	T	F	F	T
Target	+	+	-	+	-	-	-	+	-

Q.3(a)	Explain the ANN algorithm for classification problems. Define perceptron with the mathematical model and explain the training rules for the perceptron.	[5]	2	1,2
Q.3(b)	Explain the steps and draw a Decision Tree for the data shown in the table below regarding the details of transection and cheating in income tax.	[5]	3,4	4,5

S. No.	Refund	Marital 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

Q.4(a)	Explain, the steps involved in Fuzzy C mean clustering. How this method is different from other hard clustering methods.	[5]	1,2	2
Q.4(b)	For a one-dimensional data set {5 8 12 25 28 35} implement the Hierarchical clustering using single linkage and complete linkage method. Also, design the dendrogram for both the methods.	[5]	2,3	3,4
Q.5(a)	Explain in detail the probably Approximately correct (PAC) learning with suitable example.	[5]	2	2,3
Q.5(b)	Explain the reinforcement learning with its types and elements. Also, give the difference between reinforcement learning and supervised learning.	[5]	2,3	2,3

::::::02/05/2023::::::M