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Course Code	22CS/CD62
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Sixth Semester B.E. Degree Examinations, June/July 2025

MACHINE LEARNING

(Common to CSE and CSE- DS)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<u>Module-1</u>			
1.	a. Explain the working principle of find-S algorithm with a neat flow chart.	08	(2 : 1 : 1.3.1)
	b. Summarize the process involved in final design of checkers learning problem.	06	(2 : 1 : 1.3.1)
	c. Outline the various issues involved in machine learning.	06	(2 : 1 : 1.3.1)
(OR)			
2.	a. Apply candidate elimination algorithm, to find the consistent hypothesis for the following training data set:	10	(3 : 4 : 2.2.1)

RID	Age	Income	Student	Credit Rating	Buys Computer
1	Young	High	No	Fair	Yes
2	Young	High	No	Excellent	No
3	Middle	High	No	Fair	Yes
4	Senior	Medium	No	Fair	Yes
5	Young	Medium	Yes	Fair	Yes

	b. Explain inductive bias in candidate elimination algorithm.	06	(2 : 4 : 1.3.1)
	c. Outline the steps involved in list then eliminate algorithm.	04	(2 : 4 : 1.3.1)
<u>Module-2</u>			
3.	a. Explain rule post pruning.	06	(2 : 3 : 1.3.1)
	b. Construct decision tree for the following expressions: $A \vee [B \wedge C]$ and $[A \vee B] \wedge [C \wedge D]$	06	(3 : 4 : 1.3.1)
	c. Outline the steps involved in ID3 algorithm.	08	(2 : 4 : 1.3.1)
(OR)			
4.	a. Outline the scenarios suitable for the application of decision tree.	06	(2 : 2 : 1.3.1)
	b. Summarize how decision tree incorporates continuous valued attributes.	06	(2 : 2 : 1.3.1)
	c. Explain how reduced error pruning can avoid over-fitting in decision tree.	08	(2 : 2 : 1.3.1)

Module-3

5. a. Outline the steps involved in training a linear unit using gradient descent algorithm. 10 (2 : 4 : 1.3.1)
- b. Summarize the steps involved in realizing the working principle of artificial neural network using back-propagation algorithm. 10 (2 : 4 : 1.3.1)

(OR)

6. a. Outline the appropriate scenarios suitable for the application of artificial neural network. 06 (2 : 4 : 1.3.1)
- b. Summarize the convergence criterion and the reasons for failure of back-propagation. 06 (2 : 3 : 1.3.1)
- c. List out various merits and de-merits of ANN. 08 (2 : 4 : 1.3.1)

Module-4

7. a. Explain the salient features of Bayesian learning. 05 (2 : 5 : 1.3.1)
- b. Outline the merits and de-merits of KNN algorithm. 05 (2 : 5 : 1.3.1)
- c. Apply Naïve Bayes classifier and find the class label of the new instance- X: (K, Male, 2.2m) 10 (3 : 5 : 2.1.1)

PID	Name	Gender	Height	Class
1	A	Female	1.6m	Short
2	B	Male	2.0m	Tall
3	C	Female	1.9m	Medium
4	D	Female	1.85m	Medium
5	E	Male	2.8m	Tall
6	F	Male	1.7m	Short
7	G	Male	1.8m	Medium
8	H	Female	1.6m	Short
9	I	Female	1.65m	Short

(OR)

8. a. Explain KNN algorithm with an example. 06 (2 : 4 : 1.3.1)
- b. Explain the working of EM algorithm. 06 (2 : 4 : 1.3.1)
- c. Summarize the working of minimum description length principle. 08 (2 : 3 : 1.3.1)

Module-5

9. a. Outline the working principle of basic K-means algorithm. 06 (2 : 3 : 1.3.1)
- b. Explain the working principle of agglomerative hierarchical clustering. 06 (2 : 3 : 2.2.1)
- c. Illustrate the process of reducing the SSE with post-processing. 08 (2 : 2 : 2.2.1)

(OR)

10. a. Summarize different types of clustering's. 06 (2 : 4 : 1.3.1)
- b. Summarize cluster evaluation and cluster validation. 06 (2 : 4 : 1.3.1)
- c. Explain any two types of clusters. 08 (2 : 4 : 1.3.1)

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