UG/Integrated Even Semester Examination, 2025

COMPUTER SCIENCE

(10th / 4th Semester)

Course No.: MCS-652

(Machine Learning)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the right margin indicate full marks for the question. Answer any five questions selecting one from each unit.

UNIT-I

1. (a) Define well-pered learning problem? Give two examples. 3

   (b) How the training data influence the performance of learning algorithms? Explain with one example. 3

   (c) What is the target function? Explain how a target function in designed for a cheker game learning probem. 8

2. (a) What is general to specific ordering of hypothesis? Explain with an exampl. 6

   (b) Explain the differences between the Find-S and candidate elimination algorithm. 8

UNIT-II

3. (a) State the capabilities and limitations of ID3 algorithm for decision tree learning. 6

(b) What do you mean by inductive bias? Explain why inductive bias is required in in decision tree learning and how inductive bias is introduced in the TD3 algorithm. 2+3+3=8

4. (a) What do you mean by overfitting of training data in decision tree learning? Explain its impact in learning. 5

(b) Explain confusion matrix with one example. 4

(c) What is ROC curve? Explain its significance. 5

UNIT-III

5. (a) What is regression tree? Give one example and explain. 2+2=4

(b) What is linear regression? Explain how linear regression can be applied to fit a line to a set of given data in two dimensions. 10

6. What is Support Vector Machine (SVM)? Explain the function of maximum margin separation and support vector in SVM. 6+4+4=14

UNIT-IV

7. What is Bayer Theorem? Explain the Naive Bayes classifier and its working with the following data and compute the outcome showing which of the four possible things one might do in the evening base on the training data. 14

Deadlins?	Is there a party?	Lazy?	Activity
Urgent	Yes	Yes	Patry
Urgent	No	Yes	Study
Near	Yes	Yes	Party
None	Yes	No	Party
None	No	Yes	Pub
None	Yes	No	Party
Near	No	No	Study
Near	No	Yes	TV
Near	Yes	Yes	Party
Urgent	No	No	Study

8. What is density based clustering? Explain the principle and working of the DBSCAN algorithm. 3+11=14

UNIT-V

9. (a) Explain reinforcement learning. Discuss the differencs of reinforcement learning with supervised learning. 2+2=4

(b) What are genetic algorithms? Explain a general form genetic algorithm with one example. 10

10. Explain a reinforcement larning algorithm for a Tic-Tac-Toe game. 14

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