14781

(2055)

B.C.A. 6th Semester (AI & ML)
MACHINE LEARNING
Paper – BCA–606
(From the Session 2024-2025)
(Common with BCA (DS) 6th Semester
from the session, 2024-25)

Time : Three Hours]　　　　　　[Maximum Marks : 60

Note : All questions are compulsory.

SECTION – A

1. What is main difference between feature extraction and feature selection?

2. What is normalization in the context of data transformation?

3. Explain the role of data preprocessing in Machine Learning.

4. What is the function used to plot a line graph in Matplotlib?

5. What does a scatter plot represent?

6. Name one common algorithm used for classification tasks.

7. What is the goal of clustering?

8. Give full form of DBSCAN clustering algorithm.

9. Mention one application of association rule learning.

10. Name one real-world application of reinforcement learning.

11. Is reinforcement learning supervised or unsupervised?

12. Mention elements of reinforcement learning.   (12×1=12)

SECTION – B

13. List and explain two techniques to handle missing data in a dataset.

14. Discuss the importance of customizing plots in Matplotlib using example.

15. Explain the effectiveness of hierarchical clustering for datasets with varying shapes of clusters.

16. How is Q-learning different from traditional supervised learning methods.   (4×2=8)

SECTION – C

17. Discuss the advantages of feature extraction in machine learning. Mention at least *two* techniques for feature extraction.

OR

Compare Min-Max scaling and Z-score normalization with formulas and examples.

18. Explain the process of building a supervised learning model using the k-Nearest Neighbors algorithm. What is the significance of value of 'k' in the model's performance?

OR

Briefly explain the difference between a decision tree and a random forest in supervised learning.

19. How does the DBSCAN clustering algorithm deal with noise in the dataset, and why is this important in real-world data?

OR

Which clustering algorithm would be effective if large dataset are divided into smaller, similar groups based on inherent data structure? Give reasons.

20. List and explain any two key elements of a reinforcement learning system.

OR

Give an example of how reinforcement learning can be used in a game-playing scenario.

(4×4=16)

SECTION – D

21. Describe the history of machine learning. Explain the machine learning process from data collection to model evaluation. Discuss the steps involved in detail.

OR

Explain the concept of feature extraction in machine learning. Discuss any three techniques in detail. Compare and contrast these techniques in terms of their goals, advantages, and applications.

22. Compare and contrast key characteristics, advantages, and disadvantages of any three supervised learning algorithms. Also explain in what types of problems each algorithm would perform best?

OR

Discuss the importance of model evaluation in supervised learning and give a detailed description of various evaluation metrics used for classification problems. In what scenarios would you prioritize one metric over another?

23. In association rule learning, if a rule has high confidence but low lift, what does this indicate about the relationship between the items, and why might this be important in practice?

OR

Give a detailed description on types of clustering techniques with suitable examples.

24. Discuss the concept of reinforcement learning, key features and its applications.

OR

What kind of actions, states, and rewards might be used when a office cleaning robot is learning to clean a room using reinforcement learning? Explain briefly.   (4×6=24)

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