[Total No. of Questions - 9] [Total No. of Printed Pages - 2]

Dec-25-0361

CS-ML-411/CSPC-513 (Introduction to Machine Learning)

B.Tech. 4th (CBCS/NEP) [CS&E AI&ML]

B.Tech. 5th (CBCS/NEP) [AI&DS CSE (AI&ML)]

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : 1. The question paper consists of five sections A, B, C, D, and E.
2. Section E is compulsory and covers the entire syllabus.
3. Candidates must attempt one question each from Sections A, B, C, and D and the compulsory question from Section E.
4. All question carry equal marks.

SECTION - A

1. Explain the typical steps in the machine learning process, from data collection to model deployment. (12)

2. Explain cross-validation. Compare k-fold cross-validation and leave-one-out cross-validation. (12)

SECTION - B

3. Explain the working of the Support Vector Machine (SVM) with a neat diagram. Discuss its applications. (12)

4. Explain Decision Tree learning. How does entropy and information gain help in building trees? (12)

SECTION - C

5. Differentiate between hierarchical and partitioning clustering methods with examples. (12)

6. What is Principal Component Analysis (PCA)? Explain the steps involved in dimensionality reduction using PCA. (12)

SECTION - D

7. What is Q-learning? Derive the Q-learning update rule and explain its working. (12)

8. Explain the concept of Markov Decision Process (MDP). Describe its components with an example. (12)

SECTION - E (Compulsory)
(Short Answer Questions)

9. Answer all questions.

(a) List two applications of machine learning.

(b) Define overfiting and underfitting.

(c) State two advantages of Random Forest over Decision Trees.

(d) What is feature scaling? Give one method.

(e) Differentiate between clustering and classification.

(f) What is policy in reinforcement learning? (6×2=12)