M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

M.E. - Embedded Systems Technologies

24PESEL306 - MACHINE LEARNING

Regulations - 2024

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	The purpose of the validation set in machine learning is ____. (a) To train the model (b) To fine-tune hyperparameters (c) To test the model's generalization (d) To provide additional training data	1	K1	CO1
2.	Which machine learning approach is based on the assumption that similar data points are more likely to have the same labels? (a) Clustering (b) Classification (c) Regression (d) Anomaly detection	1	K1	CO1
3.	What is the main objective of a classification algorithm in supervised learning? (a) Determine the optimal number of clusters (b) Predict continuous values (c) Assign input data to predefined categories or classes (d) Identify patterns in unlabeled data	1	K1	CO2
4.	Which algorithm is used to minimize the errors between predicted and actual outputs in supervised learning? (a) Decision tree (b) Gradient Boosting (c) K-means clustering (d) Principal Component Analysis (PCA)	1	K1	CO2
5.	Which algorithm uses distance-based learning? (a) Naive Bayes (b) K-Nearest Neighbour (c) Decision Tree (d) Linear Regression	1	K1	CO3
6.	PCA is primarily used for _____ (a) Feature extraction (b) Classification (c) Data labeling (d) Model training	1	K1	CO3
7.	Which of the following is used in reinforcement learning? (a) Markov Decision Process (b) PCA (c) SVM (d) Random Forest	1	K1	CO4
8.	Dynamic pricing in e-commerce is an example of _____ (a) Supervised learning (b) Reinforcement learning (c) Unsupervised learning (d) Deep learning	1	K1	CO4
9.	Which algorithm is widely used in IoT anomaly detection? (a) CNN (b) SVM (c) K-Means (d) Decision Tree	1	K1	CO5
10.	Machine learning in healthcare is used for _____ (a) Diagnosis prediction (b) Sorting files (c) Data deletion (d) None of the above	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K–Level	CO
11.	What are the major components involved in each machine algorithm?	2	K1	CO1
12.	Differentiate between Training data and Testing Data.	2	K2	CO1
13.	What are the advantages of Naive Bayes?	2	K1	CO2
14.	How does the structure of the decision tree help in classifying a data instance?	2	K1	CO2
15.	Differentiate between PCA and Kernel PCA.	2	K2	CO3
16.	What is the purpose of K-means clustering?	2	K1	CO3
17.	Define the term 'reward' in reinforcement learning.	2	K1	CO4
18.	Explain Monte Carlo prediction with a simple illustration.	2	K2	CO4
19.	List any two machine learning models used in IoT applications.	2	K1	CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **14127**

20. Explain the need for ML-based IoT applications.   *2*   *K2*   *CO5*

21. List two applications of ML in the manufacturing industry.   *2*   *K1*   *CO6*

22. Mention any two advantages of using cloud-based ML services.   *2*   *K2*   *CO6*

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Illustrate the concept and working principle of Decision Tree by applying it to classify a given dataset using suitable real-world examples.   *11*   *K3*   *CO1*

OR

    b) Illustrate the implementation of Linear Regression and Logistic Regression models on a dataset to analyze and demonstrate their applications in prediction and classification tasks.   *11*   *K3*   *CO1*

24. a) Use K Nearest Neighbour to predict the class label from the given dataset for the new instance given. Height = 170 cm, Weight = 57 Kg and K - 4.   *11*   *K4*   *CO2*

Height (cm)	Weight (Kg)	Class
167	51	Underweight
182	62	Normal
176	69	Normal
173	64	Normal
172	65	Normal
174	56	Underweight
169	58	Normal
173	57	Normal
170	55	Normal
170	57	?

OR

    b) Using the Support Vector Machines algorithm, find the SVM classifier for the following data.   *11*   *K4*   *CO2*

Example No.	X1	X2	class
1	2	1	+1
2	4	3	- 1

25. a) Illustrate the working of the K-Means clustering algorithm by applying it to a sample dataset, and demonstrate how the optimal number of clusters can be determined using suitable methods.   *11*   *K3*   *CO3*

OR

    b) Illustrate PCA method and discuss their importance in dimensionality reduction.   *11*   *K3*   *CO3*

26. a) Examine the concept of Dynamic Pricing using reinforcement learning with suitable illustrations.   *11*   *K2*   *CO4*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **14127**

OR

b) Explain briefly, the Next Best Offer. *11 K2 CO4*

27. a) Analyze the impact of machine learning applications on healthcare and manufacturing industries by examining their challenges, benefits, and implementation outcomes. *11 K4 CO5*

OR

b) Analyze the challenges being faced in IoT without ML. *11 K4 CO5*

28. a) Analyze the role of machine learning models in IoT-based smart city applications. *11 K4 CO6*

OR

b) Illustrate in detail the applications of Machine Learning across the hospitality Industry. *11 K4 CO6*