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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

M.Tech. (First Semester – Regular/Supplementary) Examinations, January – 2026

24MCSPE11001- Machine Learning

Time: 2 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. How Machine learning is different from Deep Learning ?	CO1	K2
b. What is overfitting and under fitting in Machine learning ?	CO2	K1
c. What are the performance measure parameter in machine learning ?	CO3	K1
d. Define Delta Rule.	CO4	K1
e. Explain one suitable example of Box-plot.	CO5	K3

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. How Machine Learning differs from traditional programming and why is it important in modern computing applications?	5	CO1	K2
b. Define supervised learning. Explain its common algorithms, and applications.	5	CO1	K1
(OR)			
c. Explain briefly Random Forest Algorithm.	5	CO1	K1
d. What is reinforcement learning? Explain its key components such as agent, environment, reward, and policy.	5	CO1	K1
3.a. Explain Decision Tree Learning. Given a training dataset with 20 samples where 16 belong to Class Yes and 4 belong to Class No, calculate the entropy of the dataset and explain how entropy is used in decision tree construction.	5	CO2	K3
b. Illustrate with a small example how greedy algorithms like ID3 reduce the search space.		CO2	K2
(OR)			
c. List the issues in Decision Tree Learning. Interpret the algorithm with respect to Overfitting the data	5	CO2	K1
d. Explain pruning in decision trees. Given a decision tree where removing a subtree reduces training accuracy from 95% to 92% but improves testing accuracy from 75% to 85%, explain:(a) Why pruning is applied (b) Whether pre-pruning or post-pruning is more suitable in this case.	5	CO2	K3
4.a. Write the major difference between machine learning and ensemble learning with suitable examples in each case	5	CO3	K2
b. What is Bagging (Bootstrap Aggregating)? A dataset contains 1,000 training samples.(a) How many samples are drawn in each bootstrap dataset? (b) If a base learner has variance 0.14, explain numerically how bagging helps reduce variance in the final ensemble.	5	CO3	K2
(OR)			

c.	Discuss an algorithm for Boosting with a suitable example	5	CO3	K1
d.	Compare learning algorithms using cross-validation, learning curves, and statistical tests. Given two classifiers where one performs better on small datasets and the other improves significantly with more data, explain which classifier you would select and why.	5	CO3	K2
5.a.	What is Artificial Neural Network? Mention the type of problems where artificial neural network can be applied?	5	CO4	K1
b.	What is Recurrent Neural Network? Describe their architecture, working principle, and applications.	5	CO4	K1
	(OR)			
c.	Draw and explain Back Propagation neural network with example.	10	CO4	K2
6.a.	Explain Bayesian Learning. Given: $P(H)=0.3, P(D\|H)=0.6, P(D\|\neg H)=0.2$. Calculate the posterior probability $P(H\|D)$ using Bayes' theorem and explain its significance in learning.	5	CO5	K3
b.	Compare SVM, Naive Bayes, Logistic Regression, and k-NN.	5	CO5	K2
	(OR)			
c.	Explain about K-Nearest-neighbour algorithm with an example	5	CO5	K1
d.	How does logistic regression performs binary classification ?	5	CO5	K1

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