C   **Reg. No. :** ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code: UG405

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Artificial Intelligence & Machine learning

21UAM405 - FUNDAMENTALS OF MACHINE LEARNING

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (5 x 1 = 5Marks)

1. Machine learning is a subset of _____   CO1-U

   (a) Artificial Intelligence   (b) Deep Learning   (c) Machine Learning Model   (d) Null

2. The Unsupervised learning problems can be grouped as _____.   CO1-U

   (a) Clustering   (b) Association   (c) Both (a) and (b)   (d) None of the Above

3. What can help to reduce overfitting in an SVM classifier?   CO1-U

   (a) High-degree polynomial features   (b) Setting a very low learning rate

   (c) Use of slack variables   (d) Normalizing the data

4. Clustering is a _____   CO1-U

   (a) Supervised Learning   (b) Unsupervised learning

   (c) Reinforcement Learning   (d) None of the above

5. Which of the following is an application of reinforcement learning?   CO1-U

   (a) Topic modeling   (b) Recommendation systems

   (c) Pattern recognition   (d) Image classification

PART – B (5 x 3= 15 Marks)

6. List out any four applications of Machine Learning.   CO1-U

7. Distinguish between Classification and Regression.   CO1-U

8. How to evaluate the update weight in back propagation?   CO1-U

9. What is a Decision Tree in Machine Learning?   CO1-U

10. List out the applications in Robot control.   CO1-U

PART – C (5 x 16= 80 Marks)

11. (a) Explain the types of Machine learning and Discuss the   CO1-U   (16)
components in the design of learning systems.

Or

(b) Describe the following   CO1-U   (16)
1. Supervised Learning
2. Unsupervised Learning
3. Reinforcement Learning

12. (a) Consider the five weeks sales data (in Thousands) is given as   CO2- App   (16)
shown. Apply Linear Regression to predict the 7th and 12th week
sales.

Week X1	Sales (in Thousands) Y1
1	1.2
2	1.8
3	2.6
4	3.2
5	3.8

Or

(b) Consider the four weeks sales data is given as shown. Apply Multiple   CO2-App   (16)
Regression for the values given in table where weekly sales along with
sales for products x1 and x2 are provided.

X1 Product1 Sales	X2 Product2 Sales	Y Weekly Sales
1	4	1
2	5	6
3	8	8
4	2	12

13. (a) Draw the architecture of a Neural Network and explain its   CO1-U   (16)
operation. Mention its advantages and disadvantages.

Or

(b) Describe the working behavior of Support Vector Machine with   CO1-U   (16)
Diagrams.

14. (a) Cluster the following data points into three clusters, where the   CO2-App   (16)
point are A1(2,10), A2(2,5),A3(8,4), B1(5,8), B2(7,5), B3(6,4),
C1(1,2), C2(4,9).

Or

(b) Given the following data, use Principal Component Analysis to   CO2-App   (16)
reduce the dimension from 2 to 1.

UG405

Feature	Example1	Example2	Example3	Example4
x	4	8	13	7
y	11	4	5	14

15. (a) Explain in detail about the Passive Reinforcement Learning with examples.   CO1-U   (16)

<div align="center">Or</div>

(b) Discuss in detail how utility function works well in Reinforcement Learning?   CO1-U   (16)

UG405

UG405