

END SEMESTER EXAMINATION - OCTOBER 2025**SEMESTER 5 : INTEGRATED M.Sc. PROGRAMME COMPUTER SCIENCE - DATA SCIENCE****COURSE : 21UP5CRMCP14 : PRINCIPLES OF MACHINE LEARNING***(For Regular 2023 Admission and Supplementary 2022/2021 Admissions)*

Time : Three Hours

Max. Weightage : 30

PART A**Answer any 8 questions**

1. State the need of MLE in logistic regression.
2. Write the expression for logistic function.
3. Define the term 'model' in the context of machine learning.
4. State any two examples of real-world scenarios where logistic regression can be applied.
5. Provide two examples of when you would use multiple linear regression.
6. List any four regression algorithms.
7. A box contains playing cards of four suits - clubs, spades, diamonds and hearts which are shuffled and scattered inside the box. If a machine can recognize the colours and symbols of cards, suggest an algorithm that would help the machine to arrange each of these four types of cards together as four suits.
8. State the aim of support vector in SVM.
9. List any two applications in which machine learning has proved to be worthier than human learning.
10. Define the term synapse in the context of a neural network.

(1 x 8 = 8 Weight)**PART B****Answer any 6 questions**

11. Explain how misclassification is performed in SVM? Also discuss its need.
12. Explain briefly the classification of neural networks based on the topology.
13. Errors in learning can be of two types – errors due to 'bias' and due to 'variance'. Explain the bias-variance tradeoff.
14. Explain the process of classification in linear SVM.
15. Given below is a dataset containing the attributes of study hours and exam score where exam score is the attribute to be predicted. Calculate the total residual error from the given data.

Study Hours	2	3	4	5	6	7	8	9	10	11
Exam Score	65	75	80	85	90	92	95	97	98	99

16. Explain the concept of overfitting in logistic regression.
17. Write short notes on problem formulation in Bayesian Linear regression.
18. Write short notes on association analysis, along with an application.

(2 x 6 = 12 Weight)

PART C
Answer any 2 questions

19. Elaborate on the various types of Bayesian models.
20. Suppose you want to predict a car's fuel efficiency (miles per gallon, or mpg) based on its engine horsepower (HP). Given below is a historical data that can be used for training. Predict the fuel efficiency for 230 HP.

Horsepower	90	110	130	150	170	190	210	230	250	270
MP	32	30	28	36	34	21	20	19	17	14

21. Define the term feature. Prepare detailed notes on feature transformation.
22. Discuss how backpropagation is performed in neural networks.

(5 x 2 = 10 Weight)