PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc(SS) DEGREE EXAMINATION MAY 2025
(Eighth Semester)

Branch – SOFTWARE SYSTEMS (Five Year Integrated)

MACHINE LEARNING

Time: Three Hours   Maximum: 50 Marks

SECTION-A (5 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1 Multiple regression is used when ----------
   (i) Data has only categorical values (ii) target variable is binary
   (iii) more than 1 independent variables used (iv) single independent variable used

2 Which of the following is an example of a generative learning algorithm?
   (i) Naïve Bayes   (ii) Support Vector Machine
   (iii) Neural Networks   (iv) Decision Trees

3 The purpose of pruning in decision trees is to -------
   (i) increase tree depth   (ii) remove irrelevant nodes
   (iii) increase dataset size   (iv) make trees more complex

4 What happens when a model has high variance?
   (i) Underfitting   (ii) Overfitting
   (iii) Good generalization   (iv) Low complexity

5 Which of the following is used to evaluate clustering quality?
   (i) Confusion Matrix   (ii) ROC Curve
   (iii) Mean Squared Error   (iv) Silhouette Score

SECTION - B (15 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6 a What are the key characteristics of supervised learning?
                    OR
   b Discuss regression and its real-world applications.

7 a List the key properties of an exponential family distribution.
                    OR
   b What does it mean for a dataset to be linearly separable?

8 a How do multivariate decision trees handle feature interactions?
                    OR
   b Explain Linear Discriminant Analysis .

9 a Define VC dimension and explain its significance.

OR

  b Discuss an example of an adversarial scenario in worst-case learning.

10 a Write about the limitations of K-means clustering.

OR

  b What is AGNES, and how does it work?

SECTION -C (30 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 x 6 = 30)

11 a Describe the supervised learning setup and the challenges involved in training models.

OR

  b Compare linear regression and polynomial regression with examples.

12 a List the different types of activation functions and their impact on neural networks.

OR

  b Explain the working of K-NN and its computational complexity.

13 a Discuss the significance of feature selection in classification problems.

OR

  b Describe Maximum Likelihood Estimation and its role in parametric classification.

14 a Explain the bias-variance trade-off with a real-world example.

OR

  b Elaborate on PAC learning and its importance in machine learning.

15 a Describe the Gaussian Mixture Model (GMM) and its applications.

OR

  b Explain PCA and its role in dimensionality reduction with example.

Z-Z-Z   END