PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2025
(Sixth Semester)
Branch – MATHEMATICS
MAJOR ELECTIVE COURSE – II :ARTIFICIAL INTELLIGENCE AND 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. Which of the following is a component of Artificial Intelligence?
    (i) Learning   (ii) Training
    (iii) Designing   (iv) Puzzling

2. A software designed to evaluate whether a customer account is hacked or not is an example of _____.
    (i) Unsupervised learning   (ii) Supervised classification
    (iii) Supervised regression   (iv) None of the above

3. The first factor in a solution has an eigen value of 3.87. The total of the eigen values is 9. What proportion of variance is accounted for by this first factor?
    (i) 43%   (ii) 34.83%
    (iii) 38.70%   (iv) 11.10%

4. How many coefficients do you need to estimate a simple linear regression model (one independent variable)?
    (i) 1   (ii) 2   (iii) 3   (iv) 4

5. SVMs are less effective when ___.
    (i) The data is linearly separable
    (ii) The data is clean and ready to use
    (iii) The data is noisy and contains overlapping points
    (iv) None of the above

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

6. a) Write the characteristics of production system.
                        OR
    b) Write the algorithm for Depth First Search.

7. a) What is Machine Learning? Give an example.
                        OR
    b) How do you represent a model in supervised learning model?

8. a) Compute the SD for the following sets: Set 1=[0 8 12 20], Set 2=[8 9 11 12].
                        OR
    b) Describe data integration.

9. a) How is regression different from classification?
                        OR
    b) Describe Karl Pearson's coefficient of correlation.

10. a) Describe the applications of clustering.
                        OR
    b) Discuss relationship between margin and optimal hyperplane.

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

11. a) A 4-gallon jug and a 3-gallon jug are given. Neither of the jugs has any measuring markers on it. There is a pump which is used to fill the jugs with water. How can you get exactly 2-gallon of water into the 4-gallon jug?

OR

    b) Explain the procedure of hill climbing.

12. a) What is the role of gradient function in minimizing the cost function? Explain it.

OR

    b) What are the different types of Machine Learning algorithms? Explain it.

13. a) Find the eigenvalues and eigenvectors for the matrix A given below:

$$A=\begin{bmatrix} 7 & 3 \\ 3 & -1 \end{bmatrix}.$$

OR

    b) Explain the different types of binning methods using in data cleaning.

14. a) The rent of a property is related to its area. Given the area in square feet and rent in dollars. Find the relationship between area and rent using the concept of linear regression. Also predict the rent for a property of 790 ft^2.

Area of a property and its corresponding rental value.

Sl.No	Area (ft^2)	Rent (Rs.)
1	340	500
2	1080	1700
3	640	1100
4	880	800
5	990	1400
6	510	500

OR

    b) Explain the steps involved in Linear Regression.

15. a) Explain Norm of Vector.

OR

    b) What are the types of clustering? Explain it.

Z-Z-Z   END