Time: 3 Hours **Max. Marks: 80**

Note: 1. Q.1 is Compulsory.

2. Attempt any 3 from remaining

3. Assume suitable data if necessary

Q.1 Solve **any Four**

A. What is Machine Learning? What are the steps in developing a machine learning application? [05]

B. Differentiate between supervised and unsupervised learning. [05]

C. Draw and explain biological neural networks and compare them with artificial neural networks. [05]

D. Explain in detail the MP neuron model. [05]

E. Explain the overfitting and underfitting with example [05]

Q.2

A. Draw a block diagram of the Error Back Propagation Algorithm and explain with the flow chart the Error Back Propagation Concept. [10]

B. The values of independent variable X and the dependent variable Y are given below

X	Y
0	2
1	3
2	5
3	4
4	6

Find the least square regression line Y=aX+b. Estimate the Y when the value of X equals 10. [10]

Q.3

A. Diagonalize the matrix A [05]

$$\begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$$

B. List out and explain the applications of SVD [05]

C. Write short note on maximum expectation algorithm [05]

D. What are Activation functions? Explain the Binary, Bipolar, Continuous, and Ramp activation functions. [05]

4.

A. Write a short note on (a) Multivariate Regression and (b) Regularized Regression. [10]

B. What is the curse of Dimensionality? Explain the PCA dimensionality reduction technique in detail [10]

Q. 5

A. Design a Hebb net to implement OR function (consider bipolar inputs and targets) [10]

B. Draw Delta Learning Rule (LMS-Widrow Hoff) model and explain it with a training process flowchart. [10]

Q. 6. Write short note on any FOUR

A. Least Square Regression for classification [05]

B. Differentiate between Ridge and Lasso Regression [05]

C. Artificial Neural Network [05]

D. Feature selection methods for dimensionality reduction [05]

E. Perceptron Neural Network [05]

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