Duration: 3hrs   **[Max Marks:80]**

N.B.:   **(1) Question No 1 is Compulsory.**
          (2) Attempt any three questions out of the remaining five.
          (3) All questions carry equal marks.
          (4) Assume suitable data, if required and state it clearly.

1		Attempt **any FOUR**	**[20]**
	a	Explain Applications of Machine Learning	
	b	Explain different types of activation functions with formula.	
	c	Explain Quality of Model with respect to Confusion Matrix, Accuracy, Recall, Precision.	
	d	Justify Perceptron works only for linear separable problems.	
	e	Explain Feature Selection and Extraction concept for dimensionality reduction.	
2	**a**	Explain McCulloch-Pitts Model for different logic gates like: AND, OR, NAND and NOR gate.	**[12]**
	b	Describe expectation maximization algorithm.	**[8]**
3	**a**	Explain Issues in Machine Learning Applications.	**[10]**
	b	What are the eigenvectors? What are the significance of eigenvectors in Dimensionality Reduction	**[10]**
4	**a**	Explain backpropagation algorithm.	**[10]**
	b	Perform Linear regression on the following two-dimensional data. X is an independent variable while Y is a dependent variable.	**[10]**

X	1	1	1	2	3	3	4	5	5
Y	9	7	8	10	15	12	19	24	21

5	**a**	What is Regularized Regression? Explain Logistic regression in detail.	**[10]**
	b	Explain Delta Learning Rule (LMS-Widrow Hoff) with example for AND gate (Note: Bipolar AND gate). Min one epoch is required.	**[10]**
6	**a**	Explain the following types of NN Architecture	**[10]**

I) Single layer feed forward network

II) Multilayer feed-forward network

III) Single node with its own feedback

IV) Single-layer recurrent network

V) Multilayer recurrent network

	b	Explain the steps involved in principal component analysis.	**[10]**

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