

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION SP/2023)

CLASS: BTECH  
BRANCH: BT/CIVIL/CHEMICAL/CP&P/MECH/PROD/EEE/ECE

SEMESTER : VI  
SESSION : SP/2023

SUBJECT: IT340 MACHINE LEARNING (OPEN ELECTIVE)  
TIME: 02 Hours

FULL MARKS: 25

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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- Q.1(a) Describe the machine learning. [2] CO1 B2  
Q.1(b) Explain the different types of machine learning. [3] CO1 B1

- Q.2(a) Illustrate the following terms used in linear regression: [2] CO2 B1  
(i) Mean absolute Error  
(ii) Mean squared Error  
(iii) Root Mean square Error  
(iv) Relative MSE
- Q.2(b) Consider the following dataset in Table 1 where week and number of working hours per week spent by a research scholar in a library are tabulated. Based on the dataset, predict the number of hours that will be spent by the research scholar in the 7<sup>th</sup> and 9<sup>th</sup> week. Apply linear Regression model. [3] CO3 B3

Table 1: Dataset

X <sub>i</sub> (weeks)	1	2	3	4	5
Y <sub>i</sub> (hours spent)	12	18	22	28	35

- Q.3(a) Explain the role of sigmoid function used in logistic regression. [2] CO1 B4  
Q.3(b) Describe the pre-pruning and post pruning approaches in Decision tree. [3] CO1 B3
- Q.4(a) Describe the PCA algorithm used for feature selection. [2] CO2 B1  
Q.4(b) Discuss the trade -off between bias and variance. [3] CO2 B2
- Q.5(a) Define the margin in SVM. how you can find the largest margin ?. [2] CO3 B1  
Q.5(b) Discuss the two advantage and disadvantage of decision tree. Describe the ID3 algorithm in detail. [3] CO3 B6

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