

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: M.Tech  
BRANCH: CSE**

**SEMESTER : I  
SESSION : MO/2024**

**SUBJECT: CS535 MACHINE LEARNING**

**TIME: 3 Hours**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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|--|-------|-----|
| Q.1(a) What do you understand by Machine Learning. Explain the activities involved in Machine Learning.  | [5] 1 | 1,2 |
| Q.1(b) Compare logistic regression and linear regression.<br>Explain any two metrics used to evaluate a regression model.  | [5] 1 | 2,4 |
| Q.2(a) What do you mean by Decision tree? Explain the attribute selection measure -Information Gain.   | [5] 2 | 1,2 |
| Q.2(b) Explain Support Vector Machine. Define the terms Hyperplane, Support Vectors, Kernel, Hard and Soft Margin. Describe the significance of Kernel functions in SVM.   | [5] 2 | 1,2 |
| Q.3(a) A perceptron with step function activation function has 3 inputs I1, I2 and I3 and an output value OUT. The weights for the inputs are 0.3, 0.2 and 0.1 and bias is 0.5. Consider the inputs as I1=1.5, I2=2, I3=1. What is the output of the perceptron? | [5] 3 | 5   |
| Q.3(b) What is Recurrent Network? How it differs from Feedforward Neural Network?  | [5] 3 | 2,4 |
| Q.4(a) Use k-means clustering algorithm to create three clusters for a given set of values:{2,3,6,8,9,15,1,22}.  | [5] 4 | 6   |
| Q.4(b) Explain Expectation -Maximization algorithm.  | [5] 4 | 2   |
| Q.5(a) What are ensemble learning models? Explain bagging and boosting in detail.  | [5] 5 | 1,2 |
| Q.5(b) Consider a test dataset of ten records with expected outcomes and a set of predictions from a classification algorithm.   | [5] 5 | 5   |
| (i) Compute the confusion matrix for the data.   |       |     |
| (ii) Compute the accuracy, precision, recall, sensitivity, and specificity of the data.  |       |     |

SN	Expected	Predicted
1	Accept	Reject
2	Accept	Accept
3	Reject	Reject
4	Accept	Accept
5	Reject	Accept
6	Reject	Reject
7	Reject	Reject
8	Accept	Accept
9	Accept	Reject
10	Reject	Reject

:::25/11/2024 E:::