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| **DIT UNIVERSITY DEHRADUN**   |  |  | | --- | --- | | **B.TECH (CSE)** | **MIDTERM EXAMINATION,ODD SEM 2024-25 (SEM III)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Machine Learning** | | | | | | | | | | | | |

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| **Time: 2 Hours** | **Total Marks: 50** |
| **Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the exam.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  |  | | --- | --- | --- | --- | | **SECTION A : Attempt any four questions from the following : [4 x 5= 20]** | | | | |  | | BTL | CO | | Q.1) | You are given a dataset with 3 points. The actual values and predicted values from a model are as follows. Compute the (Goodness of Fit) Value.   |  |  | | --- | --- | | actual values ( | predicted values | | 3 | 2 | | 6 | 5 | | 9 | 8 | | L3 | CO1 | | Q.2) | Provide an explanation of classification and regression in machine learning, and illustrate your answer with relevant examples. | L2,L3 | CO1 | | Q.3) | Explain the concept of gradient descent in machine learning. What impact does the learning rate have on the gradient descent process? | L2,L4 | CO1 | | Q.4) | What is regularization, and what are the different types of regularization techniques? | L2 | CO1 | | Q.5) | How to deal with categorical values in k-means clustering. Illustrate with an example. | L2,L3 | CO4 | | **SECTION B : Attempt any three questions from the following :[3 x 10= 30]** | | | | |  | | BTL | CO | | Q.6) | Explain the bias-variance tradeoff in machine learning. How does model complexity affect the bias and variance, and Illustrate the relationship between model complexity and fitting error by the bias-variance tradeoff curve? | L2,L4 | CO1 | | Q.7) | You have a small dataset with 4 points as given below.   |  |  | | --- | --- | | Point | Class | | (1,1) | A | | (2,2) | A | | (5,5) | B | | (6,6) | B |   Classify a new point using k-nearest neighbors algorithm with . | L2 | CO4 | | Q.8) | You have a dataset of two points A & B with one feature, x. Classify a new point C with x=2 using SVM.   |  |  |  | | --- | --- | --- | | Data Point | x | Class | | A | 1 | -1 | | B | 3 | +1 | | L2 | CO3 | | Q.9) | Classify using naïve bayes classifier whether a fruit is an apple or an orange based on two features: weight (155 grams) and texture (smooth).   | Fruit | Weight (grams) | Texture (Smooth = 0, Rough = 1) | Label | | --- | --- | --- | --- | | Apple | 150 | 0 | Apple | | Apple | 160 | 0 | Apple | | Orange | 170 | 1 | Orange | | Orange | 180 | 1 | Orange | | L2 | CO3 | | |