|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. |  |  |  |  |  |  |  |  |  |  |  |  |



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **Ph.D. Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 03 – 02- 2025 **Time:** 09:30 am – 12:30 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOE | **Program:** : Ph.D. | |
| **Course Code:** EEE819 | **Course Name:** Predictive Analytics Algorithms for Electrical Engineering | |
| **Semester** | **Max Marks**:100 | **Weightage**:50% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **30** | **20** | **10** | **30** | **10** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60Marks** | | | | |
| **1** | Describe how feature importance is calculated in decision trees and its significance in model interpretation. | **10 Marks** | **L2** | **CO1** |
| **2** | Discuss how you would evaluate a linear regression model. Explain the significance of metrics like R-squared, Mean Squared Error (MSE), and Adjusted R-squared. | **10 Marks** | **L2** | **CO2** |
| **3** | Define Support Vector Machine (SVM) for classification. How does SVM maximize the margin between classes, and what is the role of support vectors in the decision-making process? | **10 Marks** | **L2** | **CO2** |
| **4** | Define boosting in the context of ensemble methods. How does boosting reduce bias and improve the performance of weak learners? | **10 Marks** | **L2** | **CO3** |
| **5** | What is a Committee Machine in ensemble learning? Explain how stacking works as an ensemble method. | **10 Marks** | **L2** | **CO4** |
| **6** | What are random forests, and how do they differ from a single decision tree? Discuss the role of bootstrapping and feature selection in building random forests. | **10 Marks** | **L2** | **CO5** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions. Each question carries 20 marks 2Q x 20 = 40 Marks** | | | | | |
| **7.** |  | Explain Partial Least Squares (PLS) regression and how it differs from Principal Component Regression (PCR) and multiple linear regression. Discuss how PLS handles collinearity and its use in high-dimensional data settings. | **20 Marks** | **L3** | **CO1** |
|  | | | | | |
| **8.** |  | Define reinforcement learning (RL) and explain its components. Compare model-free and model-based approaches and describe algorithms like Q-learning and policy gradients. | **20 Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***