PRESIDENCY UNIVERSITY
BENGALURU

Department of Research & Development

Mid - Term Examinations - AUGUST 2024

Odd Semester: Ph.D. Course Work

Course Code: EEE812

Course Name: Role of Data Analytics and Machine Learning in PowerSystem

D**epartment: EEE**

Date: 12-08-2024

Time: 02.00pm to 03.30pm

Max Marks: 50

Weightage: 25%

Instructions:
  (i) Read all questions carefully and answer accordingly.
  (ii) Do not write any matter on the question paper other than roll number.

PART A (THOUGHT PROVOKING)

Answer all the Questions. Each question carries 5 marks.   (4Qx 5M=20M)

1. Machine learning (ML) has a growing range of applications in power systems, enhancing efficiency, reliability, and decision-making across various aspects of electricity generation, distribution, and consumption. Explain how ML can be applied Energy theft detection and grid security.
(CO:01BL: Comprehension)

2. Supervised Learning and Unsupervised Learning are two fundamental approaches in machine learning, each with distinct methods, purposes, and applications.Distinguish between them with respect to their characteristics and applications.(CO:01   BL: Comprehension)

3. Data Science and Machine Learning (ML) are rapidly evolving fields with growing importance across various sectors. Summarize the applicationsData Science and Machine Learning in any two sectors.
(CO:02BL: Comprehension)

4. Analytics is the systematic computational analysis of data. It helps organizations interpret data to make informed decisions and improve performance. Identify the data analytics that can be used for the following cases and also mention the techniques used for computational analysis of data.
   a) Predicting customer behavior, forecasting sales trends, or estimating future equipment maintenance needs.
   b) Generating reports on sales performance, calculating average customer spend, or summarizing website traffic metrics(CO:02   BL: Comprehension)

PART B (PROBLEM SOLVING)

Answer all the Questions. Each question carries 10 marks.   (3Qx 10M= 30M)

5. Compute the local minima of the function $f(x)=x^2+4x+4$. State the importance of local minima in Data Science and Machine Learning applications.
    (CO:01 BL: Application)

6. Find the eigenvalues and eigenvectors of the matrix D = $\begin{bmatrix} 3 & 4 \\ 6 & 2 \end{bmatrix}$.   (CO:02 BL: Application)

7. Solve the system of linear equationsgiven below by using matrix
    $2x + 3y = 13$
    $4x - y = 5$ (CO:02   BL: Application)