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**PRESIDENCY  
UNIVERSITY**  
BENGALURU

**School of Engineering**

**Mid - Term Examinations - November 2024**

**Semester:** V

**Date:** 07/11/2024

**Course Code:** ECE3020

**Time:** 11.45am to 01.15pm

**Course Name:** Computational Intelligence and Machine Learning

**Max Marks:** 50

**Program:** B. Tech

**Weightage:** 25%

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**Instructions:**

*(i) Read all questions carefully and answer accordingly.*

*(ii) Do not write anything on the question paper other than roll number.*

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**Part A**

**Answer ALL the Questions. Each question carries 2marks.**

**5Qx2M=10M**

- |   |   |         |   |     |
|---|---|---------|---|-----|
| 1 | Write short note on concept of Overfitting with suitable diagram.                 | 2 Marks | U | CO1 |
| 2 | Differentiate between classification and regression. [Any four points]            | 2 Marks | U | CO1 |
| 3 | Write short note on concept of training a model in machine learning               | 2 Marks | U | CO3 |
| 4 | Write a short note on clustering in unsupervised machine learning.                | 2 Marks | U | CO1 |
| 5 | Write a short note on test-train split in machine learning with suitable example. | 2 Marks | U | CO3 |

**Part B**

**Answer ALL Questions. Each question carries 10 marks.**

**4QX10M=40M**

- |   |   |          |   |     |
|---|---|----------|---|-----|
| 6 | Work out the Confusion Matrix and compute the accuracy of the model through the Predicted Class given below and comment on the performance of the model based on True Positive (TP), True Negative (TN), False Positive (FP) and False Negative (FN). | 10 Marks | A | CO3 |
|---|---|----------|---|-----|

Observation	Actual Class	Predicted Class
1	Positive	Positive
2	Positive	Negative
3	Negative	Positive
4	Negative	Negative
5	Positive	Positive
6	Negative	Positive

**Or**

7 Machine learning engineer has been given a task of designing an application using suitable machine learning model. Explain points you will consider while selecting a model for an application. **10 Marks U C01**

8 a. Write brief note on decision tree algorithm with respect to its structural components and working mechanism. **05 Marks U C01**

b. Write brief note on the k-means clustering algorithm and explain the stepwise procedure to classify the given input data into various classes. **05 Marks U C01**

**Or**

9 The table below shows observations relating independent variable (X) to dependent variable (Y). Calculate the Linear Regression Coefficients and hence find the equation of the model. Simultaneously compute the value of R-squared metric. **10 Marks A C03**

Observation	X (Independent Variable)	Y (Dependent Variable)
1	1	1
2	2	2
3	3	4
4	4	5
5	5	7

- 10 a. For the underlying observations, use the K-NN algorithm predict the Class of new data point (5,4) taking the value of K=3. **06 Marks** **A** **C03**

Observation	X1	X2	Class
1	1	2	A
2	2	3	A
3	3	3	B
4	6	5	B
5	7	8	B
6	4	7	A

- b. Give some real-life applications of classification algorithms in Machine Learning. **04 Marks** **U** **C01**

**or**

- 11 A dataset of coffee shop outlets in southern India is given for training a model and predict the suitable location to open new outlet which will not affect the business of existing outlets and increase the customer outreach of the brand. In your opinion which supervised machine learning model will give best possible prediction. Justify your choice with brief explanation. **10 Marks** **U** **C03**

- 12 a. What are some common signs of Underfitting in a machine learning model? What are the causes of Underfitting and how it is prevented? **06 Marks** **U** **C01**
- b. Write a short note on Logistic Regression citing the equation involved. **04 Marks** **U** **C01**

**Or**

- 13 a. Differentiate between supervised and unsupervised machine learning citing algorithms. **05 Marks** **U** **C01**
- b. Briefly differentiate between Linear Regression and Logistic Regression. **05 Marks** **U** **C01**