Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech/ Int. B.Tech Winter 2024 - 25 Examination

Semester: 7 & 11 **Date: 15/11/2024**

Subject Code: 203105515 **Time: 10:30 am to 01:00 pm**

Subject Name: Machine Learning **Total Marks: 60**

Instructions:

1. This question paper comprises of two sections. Write answer of both the sections in separate answer books.
2. From Section I, **Q.1 is compulsory, attempt any THREE from Q. 2 to Q. 5**
3. From Section II, **Q.6 is compulsory, attempt any THREE from Q. 7 to Q. 10**
4. Make suitable assumptions wherever necessary.
5. Start new question on new page.

<table>
<tr><th colspan="6">Section-A (30 Marks)</th></tr>
<tr><td>Q.1</td><td>Objective Type Questions -
(All are compulsory and each of two marks)</td><td>(6)</td><td>CO</td><td>PO</td><td>Bloom's Taxonomy</td></tr>
<tr><td></td><td>1. Define supervised and unsupervised learning.</td><td></td><td>1</td><td>1</td><td>Remembering</td></tr>
<tr><td></td><td>2. What is machine learning? Define with an example.</td><td></td><td>1</td><td>1</td><td>Remembering</td></tr>
<tr><td></td><td>3. What are the key differences between Multiclass and Binary Class Classification?</td><td></td><td>1</td><td>2</td><td>Understanding</td></tr>
<tr><td>Q.2</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What is clustering in machine learning?</td><td>(2)</td><td>3</td><td>2</td><td>Understanding</td></tr>
<tr><td></td><td>B) Describe the techniques of evaluating classification models. Provide an example</td><td>(6)</td><td>4</td><td>3</td><td>Analyzing</td></tr>
<tr><td>Q.3</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What is ROC Curve?</td><td>(2)</td><td>4</td><td>3</td><td>Applying</td></tr>
<tr><td></td><td>B) What are the differences between Linear and Logistics Regression? Provide an example to illustrate the difference.</td><td>(6)</td><td>2</td><td>2</td><td>Understanding</td></tr>
<tr><td>Q.4</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What is the difference between Bagging and Boosting?</td><td>(2)</td><td>3</td><td>1</td><td>Remembering</td></tr>
<tr><td></td><td>B) Describe the Naïve Bayes Classifier and its example</td><td>(6)</td><td>3</td><td>2</td><td>Understanding</td></tr>
<tr><td>Q.5</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What are the Step involved in Preprocessing Data and why is it important?</td><td>(2)</td><td>2</td><td>2</td><td>Understanding</td></tr>
<tr><td></td><td>B) we have the following small dataset of three attributes: Height (in cm), Weight (in kg), and Class (Fit or Unfit). We want to classify a new individual based on their height and weight.

<table><tr><th>Person</th><th>Height (X1)</th><th>Weight (X2)</th><th>Class</th></tr><tr><td>1</td><td>160</td><td>55</td><td>Fit</td></tr><tr><td>2</td><td>170</td><td>60</td><td>Fit</td></tr><tr><td>3</td><td>180</td><td>65</td><td>Fit</td></tr><tr><td>4</td><td>190</td><td>70</td><td>Unfit</td></tr><tr><td>5</td><td>200</td><td>75</td><td>Unfit</td></tr></table></td><td>(6)</td><td>4</td><td>3</td><td>Applying</td></tr>
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<table>
<tr><td></td><td>Now a Classify: we have a new person with a height of 175 cm and weight of 62 kg, and we want to classify them as Fit or Unfit using k-NN with k=3</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Section-B (30 Marks)</td></tr>
<tr><td>Q.6</td><td>Objective Type Questions -
(All are compulsory and each of two marks)</td><td>(6)</td><td></td><td></td><td></td></tr>
<tr><td></td><td>1. List the steps involved in the machine learning pipeline.</td><td></td><td>1</td><td>2</td><td>Understanding</td></tr>
<tr><td></td><td>2. What is dimensionality reduction? Why is it used?</td><td></td><td>1,2</td><td>1</td><td>Remembering</td></tr>
<tr><td></td><td>3. Define PAC.</td><td></td><td>1</td><td>1</td><td>Remembering</td></tr>
<tr><td>Q.7</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What are the differences between Single layer & Multi-layer Perceptron.</td><td>(2)</td><td>2</td><td>2</td><td>Understanding</td></tr>
<tr><td></td><td>B) Describe the Process of Optimization of tuning parameters in a Machine Learning Model. Discuss different methods used for Optimization and their Significance.</td><td>(6)</td><td>2</td><td>3</td><td>Applying</td></tr>
<tr><td>Q.8</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) Explain the Process of Data Collection in Machine Learning</td><td>(2)</td><td>1</td><td>2</td><td>Understanding</td></tr>
<tr><td></td><td>B) Explain K-means clustering algorithm with example</td><td>(6)</td><td>3</td><td>1</td><td>Applying</td></tr>
<tr><td>Q.9</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What is Candidate Elimination Algorithm?</td><td>(2)</td><td>3</td><td>1</td><td>Remembering</td></tr>
<tr><td></td><td>B) Explain Support Vector Machine and its Type</td><td>(6)</td><td>4</td><td>2</td><td>Understanding</td></tr>
<tr><td>Q.10</td><td>Answer the following questions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>A) What is Random Forest and its Real Life Example</td><td>(2)</td><td>4</td><td>1</td><td>Understanding</td></tr>
<tr><td></td><td>B) We have a dataset of 2D points with the following features and labels:

<table><tr><th>Point</th><th>Feature 1 (X1)</th><th>Feature 2 (X2)</th><th>Class</th></tr><tr><td>A</td><td>1</td><td>2</td><td>Red</td></tr><tr><td>B</td><td>2</td><td>3</td><td>Red</td></tr><tr><td>C</td><td>3</td><td>3</td><td>Blue</td></tr><tr><td>D</td><td>6</td><td>5</td><td>Blue</td></tr><tr><td>E</td><td>7</td><td>8</td><td>Blue</td></tr></table>
Now classify a new point F with features (4 ,4) using k-NN with k = 3.</td><td>(6)</td><td>4</td><td>3</td><td>Applying</td></tr>
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