Seat No:_____ Enrollment No._____

PARUL UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

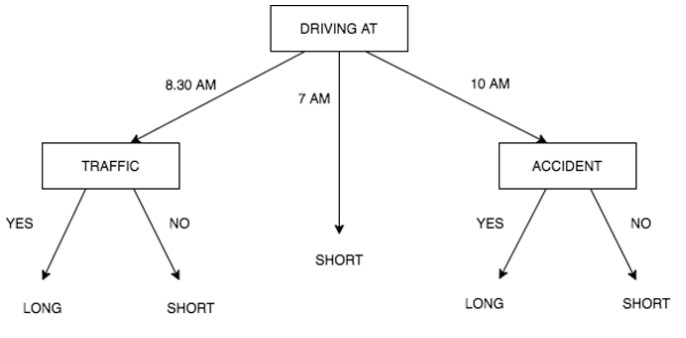
B.Tech. Summer 2023 - 24 Examination

Semester :- 7 **Date :- 18-04-2024**
Subject Code: 203105515 **Time:- 02:00 pm to 04:30 pm**
Subject Name: Machine Learning **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1	Objective Type Questions:	(15)	CO	PO	Bloom's Taxonomy
1.	The full form of PAC is _____ a) Partly Approximation Computation b) Probability Approximation Curve c) Probably Approximately Correct d) Partly Approximately Correct	1	1	1	R
2.	Which is a better algorithm than gradient descent for optimization? a) Conjugate gradient b) Cost Function c) ERM rule d) PAC Learning	1	3	2	A
3.	The output is whether a person will vote or not, based on several features. It is an example of multiclass classification. a) True b) False	1	1	2	A
4.	For given y = {0, 1, …, n}. This problem is divided into _____ binary classification problems. a) n b) 1/n c) n + 1 d) 1/(n+1)	1	4	1	E
5.	The outputs of an image recognition system is {0, 0, 1, 0}. The classes are dog, cat, elephant, and lion. What is the image of, according to our algorithm? a) Dog b) Cat c) Elephant d) Lion	1	1	3	U
6.	K-Nearest Neighbors (KNN) is classified as what type of machine learning algorithm? a) Instance-based learning b) Parametric learning c) Non-parametric learning d) Model-based learning	1	1	1	R
7.	What's the key benefit of using deep learning for tasks like recognizing images? a) They need less training data than other methods. b) They're easier to explain and understand than other models. c) They can learn complex details from the data on their own. d) They work faster and are more efficient computationally.	1	1	1	R
8.	What is Machine learning? a) The selective acquisition of knowledge through the use of computer programs b) The selective acquisition of knowledge through the use of manual programs c) The autonomous acquisition of knowledge through the use of computer programs d) The autonomous acquisition of knowledge through the use of manual programs	1	1	1	R
9.	AdaBoost is an example of: a)Bagging algorithm b) Boosting algorithm c) Randomized algorithm d) Reinforcement learning algorithm	1	1	2	U

10.	Suppose we are using a random forest algorithm to solve regression problem and there are 4 data points. The value returned by the model and the actual value for the data points 1, 2, 3, and 4 are 11, 14, 9, 10 and 8, 10, 12, 14 respectively. What is the mean squared error? a) 11.5 b) 14 c) 12.5 d) 10	**1**	**3**	**3**	**E**
11.	Which of the following statements is false about k-Nearest Neighbor algorithm? a) It stores all available cases and classifies new cases based on a similarity measure b) It has been used in statistical estimation and pattern recognition c) It cannot be used for regression d) The input consists of the k closest training examples in the feature space	**1**	**1**	**1**	**U**
12.	Support vector machines cannot be used for regression. a) False b) True	**1**	**1**	**1**	**R**
13.	Point out the wrong combination. a) True negative=correctly rejected b) False negative=correctly rejected c) False positive=correctly identified d) All of the mentioned	**1**	**1**	**2**	**U**
14.	Which of the following is not a machine learning algorithm? a) SVG b) SVM c) Random forest d) None of the mentioned	**1**	**1**	**1**	**R**
15.	For k cross-validation, larger k value implies more bias. a) True b) False	**1**	**1**	**2**	**A**
Q.2	**Answer the following questions. (Attempt any three)**	**(15)**			
	A) Differentiate between Training data and Testing Data	**5**	**1**	**2**	**R**
	B) What are the Different types of Optimization Problems?	**5**	**1**	**2**	**R**
	C) What is the general principle of an ensemble method and what is bagging and boosting in ensemble method?	**5**	**1**	**1**	**R**
	D) Differentiate between Supervised, Unsupervised and Reinforcement Learning	**5**	**1**	**1**	**R**
Q3.	**A)** Consider the figure. If person A starts driving at 8:30 AM and there are no other vehicles on the road, and another person B starts driving at 10 AM and there is an accident on the road, what will be the commute time of A and B respectively? Explain in detail the concept to reach to the decision.  	**(15)** **7**	**4**	**3**	**E,A**
	B) Explain the following terms with respect to K - Nearest Neighbor Learning : i) Regression ii) Residual iii) Kernel Function.	**8**	**1**	**1**	**R**
	OR				

	B) What is Bias, Variance and what do you mean by Bias-Variance Tradeoff?	**8**	**1**	**1**	**U,R**
Q4.	**A)** Write down the algorithm for the K-means Clustering technique. What are the Distance Metrics used for quantitative and qualitative attributes?	**(15) 8**	**2**	**3**	**R,U**
	OR				
	A) What is perceptron and what are its basic components? How does perceptron work?	**8**	**1**	**1**	**R,U**
	B) What is principal component analysis? How does it work? Explain	**7**	**1**	**2**	**E,U**