Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec-2023

RA3EL08 Machine Learning

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Identify the type of learning in which labelled training data is used. **1**

(a) Reinforcement learning (b) Unsupervised learning

(c) Supervised learning (d) Semi unsupervised learning

ii. The most common issue when using machine learning is_____. **1**

(a) Poor Data Quality (b) Inadequate Infrastructure

(c) Lack of skilled resources (d) None of these

iii. Data points have zero residual: **1**

(a) If they are above the regression line

(b) If they are below the regression line

(c) If the regression line actually passes through the point

(d) None of these

iv. _____ controls the magnitude of a step taken during gradient descent. **1**

(a) Parameter (b) Learning rate

(c) Step rate (d) Momentum

v. What is the disadvantage of decision trees? **1**

(a) Factor analysis

(b) Decision trees are robust to outliers

(c) Decision trees are prone to be overfit

(d) All of these

vi. Support Vector Machine (SVM) can be used for _____. **1**

(a) Classification only (b) Regression only

(c) Both (a) and (b) (d) None of these

P.T.O.

vii. In SVM, what is a hyperplane? **1**
(a) Decision boundaries (b) Data points
(c) Features (d) None of these

viii. When do we need kernel PCA? **1**
(a) When we need to capture non-linearity in the data
(b) When there are kernels in the data
(c) When any two features are highly correlated
(d) When the we need to reduce the number of dimensions to m/2, where m is the original number of features

ix. Which of the following is an example of time series problem? **1**
I. Estimating number of hotel rooms booking in next 6 months.
II. Estimating the total sales in next 3 years of an insurance company.
III. Estimating the number of calls for the next one week.
(a) I and II (b) I and III
(c) All of these (d) None of these

x. If the demand is 100 during October 2016, 200 in November 2016, 300 in December 2016, 400 in January 2017. What is the 3-month simple moving average for February 2017? **1**
(a) 300 (b) 350
(c) 400 (d) Need more information

Q.2 i. What is overfitting and underfitting? **2**
ii. Compare and contrast Supervised and unsupervised machine learning algorithms. **3**
iii. How bias and variance impact the performance of machine learning model? Explain with suitable example. **5**
OR iv. What are the different techniques to avoid overfitting in machine learning model? Explain with example. **5**

Q.3 i. What is linear regression? **2**
ii. What is gradient descent algorithm? Explain different types and working procedure of gradient descent algorithm. **8**
OR iii. State linear discriminant analysis algorithm. Explain how LDA is used for dimensionality reduction in Machine learning. **8**

Q.4 i. What is K nearest neighbours algorithm? Explain with example. **3**

ii. State Support vector machine (SVM). Also explain different kernel functions in SVM. **7**
OR iii. What is decision tree algorithm? Explain different criteria of attribute selection measures. **7**

Q.5 i. What are the missing values? How do you handle missing values? **4**
ii. What is K means clustering algorithm? Write working procedure of it. **6**
OR iii. What is the curse of dimensionality? Explain. How principal component analysis (PCA) is used for dimensionality reduction with example? **6**

Q.6 Attempt any two:
i. What are the five time series forecasting methods? Explain. **5**
ii. What methods will you use to measure the similarity/difference between two time-series vectors? **5**
iii. What are the four components of a time series forecast? Explain. **5**

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Marking Scheme

RA3EL08 (T)- Machine Learning

Q.1	i)	C		**1**
	ii)	A		**1**
	iii)	C		**1**
	iv)	B		**1**
	v)	C		**1**
	vi)	C		**1**
	vii)	A		**1**
	viii)	A		**1**
	ix)	C		**1**
	x)	A		**1**

Q.2	i.	Definition of each	1 mark	**2**
	ii.	Advantage minimum 2	1.5 marks	**3**
		Disadvantage minimum 2	1.5 marks	
	iii.	Impact of bias and varience	3 marks	**5**
		Example	2 marks	
OR	iv.	techniques to avoid overfitting (Any 4)	4 marks	**5**
		Explain with example.	1 mark	
Q.3	i.	Regression definition	2 marks	**2**
	ii.	Gradient descent algorithm	4 marks	**8**
		Types	2 marks	
		working procedure	2 marks	
OR	iii.	State Linear discriminant	4 marks	**8**
		how LDA is used for dimensionality reduction	4 marks	
Q.4	i.	K nearest neighbours algorithm	2 marks	**3**
		example.	1 mark	
	ii.	Support vector machine (SVM)	3 marks	**7**
		different kernel functions in SVM.	4 marks (1 for each)	
OR	iii.	decision Tree algorithm	4 marks	**7**
		different criteria of attribute selection measures	3 marks	
Q.5	i.	What are the missing values	2 marks	**4**
		How do you handle missing values	2 marks	
	ii.	K means clustering algorithm	3 marks	**6**
		Write working procedure of it.	3 marks	
OR	iii.	curse of dimensionality	3 marks	**6**
		How Principal component	3 marks	
Q.6		Attempt any two:		
	i.	5 time series forecasting methods	1 mark for each method	**5**
	ii.	similarity/difference between two time-series vectors	2 mark for each method	**5**
	iii.	four components of a time series forecast	1 mark for each component	**5**

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