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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth Semester

18EIE304T - MACHINE LEARNING

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	Machine learning is termed as (A) The autonomous acquisition of knowledge through the use of manual programs (B) The selective acquisition of knowledge through the use of manual programs (C) The selective acquisition of knowledge through the use of computer programs (D) The autonomous acquisition of knowledge through the use of computer programs	1	1	1
2.	Analysis of ML algorithm needs (A) Statistical learning theory (B) computational learning theory (C) both statistical and computational learning (D) Information theory	1	1	1
3.	Which of the following is an example of a classification problem? (A) Predicting the age of a person based on their income (B) Predicting the price of a house based on its features (C) Predicting the weight of a person based on their height (D) Predicting whether a loan will be approved or not for a customer	1	1	1
4.	Among the following option identify the one which is not a type of learning (A) unsupervised (B) supervised (C) Semi-unsupervised (D) Reinforcement	1	1	1
5.	Suppose, the target variable is whether a passenger will survived or not . What type of technique is required to predict the target variable? (A) regression (B) classification (C) dimensionality reduction (D) clustering	1	1	2
6.	To remove noise and inconsistent data ____ is needed. (A) Data Integration (B) Data Cleaning (C) Data Transformation (D) Data Reduction	1	1	2
7.	Random error or variance in a measured variable is termed as (A) Noise (B) incomplete data (C) inconsistent data (D) faulty data	1	1	2
8.	Which of the following is an example of a clustering algorithm? (A) Decision tree (B) Random forest (C) K-means (D) Gradient descent	1	1	2

9.	What is the minimum number of variables/ features required to perform clustering (A) 0 (B) 1 (C) 2 (D) 3	1	1	3
10.	If the data points can be separated using a flat hyperplane, then it is _____ separable (A) linearly (B) non-linearly (C) not (D) probably	1	1	3
11.	Which of the following clustering requires merging approach? (A) Partitional (B) Hierarchical (C) Naive Bayes (D) Spectral	1	1	3
12.	Which of the following can act as possible termination conditions in K-Means? 1. For a fixed number of iterations. 2. The assignment of observations to clusters does not change between iterations. 3. Centroids do not change between successive iterations. (A) Only 1 and 2 (B) Only 2 and 3 (C) Only 1 and 3 (D) all 1, 2 and 3	1	1	3
13.	What is purpose of Axon? (A) receptors (B) transmitter (C) transmission (D) absorption	1	1	4
14.	What do the gradients of backpropagation compute? (A) Profit Function (B) Loss Function (C) Positive Function (D) Negative Function	1	1	4
15.	_____denotes the total number of samples from a dataset that is used for calculating the gradient for each iteration (A) batch (B) task (C) sample (D) node	1	1	4
16.	Gradient descent is highly used in _____ (A) Reinforced learning (B) Unsupervised learning (C) Supervised Machine learning (D) Semi supervised learning	1	1	4
17.	Which of the following statements about spectral clustering is true? (A) It is based on the concept of centroid distance. (B) It can handle datasets with varying density. (C) It requires the number of clusters as an input parameter. (D) It is particularly effective for image segmentation.	1	1	5
18.	Which of the following statements about the affinity propagation algorithm is true? (A) It requires the number of clusters as an input parameter. (B) It can handle datasets with varying density. (C) It forms clusters by minimizing the within-cluster variance. (D) It is based on the concept of centroid distance.	1	1	5
19.	Identify the clustering method which takes care of variance in data (A) Hierarchical (B) Decision Tree (C) k-means (D) Gaussian mixture model	1	1	4
20.	In the K-means algorithm for partitioning, each cluster is represented by the ___ of objects in the cluster. (A) Mean (B) Median (C) Mode (D) Member	1	1	5

PART - B (5 × 4 = 20 Marks) **Marks BL CO**

Answer **any 5** Questions

		Marks	BL	CO
21.	List the types of machine learning techniques	4	2	1
22.	Interpret with the diagram, the supervised classification model	4	2	1
23.	Define any one distance measure used in nearest neighbourhood algorithm?	4	2	2
24.	Explain the Hierarchical clustering approach	4	2	3
25.	Interpret the Perceptron which computes AND logic with diagram	4	2	4
26.	Describe briefly the spectral clustering	4	2	3
27.	Associate an example of affinity propagation method in ML	4	2	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Explain in detail the different types of machine learning algorithms with illustrations and examples	12	2	1

(OR)

(b) Describe and draw the decision tree for predicting the disease risk for the following data:

Age	Hypertension	Smoker	Risk of disease
Young	less	Yes	low
Young	more	Yes	high
Middle	more	No	low
Middle	less	Yes	low
Middle	more	no	low
Old	more	yes	high
Middle	less	yes	low
Middle	more	no	low
Young	less	no	low
Young	more	yes	high
Old	less	no	low
Old	more	no	low

Show the results for test data shown below based on the decision tree

Age	Hypertension	Smoker	Risk of disease
Young	more	no	?
Old	less	yes	?

29. (a) Illustrate the various tasks used in data preprocessing for ML with diagrams. 12 4 2

(OR)

(b) Classify the test data using k-NN algorithm for k = 3 with Euclidean's distance and show the working.

Sepal Width (cm)	Petal Length (cm)	Petal Width (cm)	Class
3.2	4.7	1.4	Iris-versicolor
3.2	4.5	1.5	Iris-versicolor
3.1	4.9	1.5	Iris-versicolor
3.5	1.4	0.2	Iris-setosa
2.8	4.6	1.5	Iris-versicolor
2.9	5.6	1.8	Verginica
3	1.4	0.2	Iris-setosa
3.2	1.3	0.2	Iris-setosa
2.7	5.1	1.9	Verginica
3	5.9	2.1	Verginica
2.3	4	1.3	Iris-versicolor
3.1	1.5	0.2	Iris-setosa
3.6	1.4	0.2	Iris-setosa
3	5.8	2.2	Verginica
3	6.6	2.1	Verginica

Test data:

Sepal Length (cm)	Sepal Width (cm)	Petal Length (cm)	Petal Width (cm)	Class
4.5	2.3	1.3	0.3	?

30. (a) Describe in detail the steps involved in hierarchical clustering technique with example 12 3 3

(OR)

(b) Illustrate the process involved in developing Bayesian network for unsupervised learning

31. (a) Explain in detail the backpropagation algorithm and its application 12 3 4

(OR)

(b) Determine the optimisation technique using Gradient descent algorithm

32. (a) Apply clustering algorithm to determine the fingerprint and explain the steps 12 3 5

(OR)

(b) Illustrate in detail the steps involved in affinity propagation algorithm

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