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**BRAINWARE UNIVERSITY**

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Term End Examination 2025-2026**Programme – B.Tech.(RA)-2023****Course Name – Machine Learning****Course Code - OEC-ECR601A****(Semester VI)****Full Marks : 60****Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

(i) Choose from the following that Machine Learning defines

- | | |
|---|---|
| a) A technique to make machines sentient | b) A field of study that gives computers the ability to learn without being explicitly programmed |
| c) A way to program computers to follow specific instructions | d) A method for optimizing algorithms |

(ii) Choose the life cycle of a typical machine learning project

- | | |
|---|---|
| a) Data preprocessing, training, evaluation, deployment | b) Data collection, analysis, coding, testing |
| c) Model building, validation, debugging, deployment | d) Planning, execution, monitoring, feedback |

(iii) Choose from the following supervised learning is

- | | |
|------------------------------------|--|
| a) Learning with labeled data | b) Learning without any labels |
| c) Learning with unstructured data | d) Learning with reinforcement signals |

(iv) Identify from the following that a classification problem is

- | | |
|----------------------------|----------------------------|
| a) Predicting house prices | b) Predicting stock prices |
| c) Identifying spam emails | d) Predicting temperature |

(v) Select a method for feature selection in linear regression.

- | | |
|---------------------------------------|--|
| a) PCA (Principal Component Analysis) | b) LASSO (Least Absolute Shrinkage and Selection Operator) |
| c) K-nearest neighbors | d) Apriori algorithm |

- (vi) Define regularization in linear regression.
- a) Adding a penalty term to the cost function to discourage large coefficients b) Reducing the number of features
- c) Increasing the learning rate d) Simplifying the hypothesis function
- (vii) Choose a disadvantage of polynomial regression compared to linear regression.
- a) Polynomial regression can capture nonlinear relationships b) Polynomial regression is more prone to overfitting
- c) Polynomial regression is computationally less expensive d) Polynomial regression is easier to interpret
- (viii) Choose the type of Naïve Bayes classifier that assumes equal importance for all features.
- a) Gaussian Naïve Bayes b) Multinomial Naïve Bayes
- c) Bernoulli Naïve Bayes d) Complement Naïve Bayes
- (ix) Indicate a disadvantage of Random Forest classifiers.
- a) They are prone to overfitting b) They are computationally expensive
- c) They are less accurate than Decision Trees d) They cannot handle categorical data
- (x) What does the prior probability represent in Naïve Bayes classifiers?
- a) The probability of features given a class b) The probability of a class given the features
- c) The overall likelihood of features d) The probability of each class independently
- (xi) What is an advantage of Random Forest compared to KNN?
- a) Random Forest is less affected by outliers b) Random Forest is faster for large datasets
- c) Random Forest is more interpretable d) Random Forest doesn't require feature scaling
- (xii) Choose the algorithm that is commonly used for clustering in Unsupervised Learning.
- a) Random Forest b) Naive Bayes
- c) K-Means d) Support Vector Machines
- (xiii) Indicate from the following that is NOT a common activation function used in neural networks.
- a) ReLU b) Tanh
- c) Sigmoid d) Mean Squared Error
- (xiv) A neural network model with multiple hidden layers is often related to:
- a) Deep neural network (DNN) b) Shallow neural network (SNN)
- c) Wide neural network (WNN) d) Sparse neural network (SNN)
- (xv) Identify the role of an optimizer in the training of neural networks.
- a) Setting the learning rate b) Initializing weights
- c) Updating weights based on gradients d) Choosing the activation function

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe machine learning in brief.

(3)

3. Define K-Means Clustering.

(3)

4. Describe types of linear regression.

(3)

5. Relate Artificial Neural Networks (ANNs) with a model of biological neural networks. (3)
6. Explain the types of logistic regression. (3)

OR

Illustrate sigmoid function. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe linear regression in machine learning. (5)
8. Compare filter, wrapper, embedded methods of feature selection. (5)
9. Given dataset: A(1,2), B(1,4), C(1,0), D(4,2), E(4,4), F(4,0). Evaluate WCSS for k=2. (5)
10. Explain the backpropagation in Artificial Neural Networks. (5)
11. Given a sample dataset as follows: (5)
Age = [22 25 28 35] & Buy = [0 0 1 1]
Illustrate the best split using CART.
12. Explain the feature selection approaches in machine learning with example. (5)

OR

Illustrate the working of Principal Component Analysis with an example. (5)
