BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(RA)-2022
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) Identify the example of a machine learning application

a) Calculating mathematical equations
b) Sorting data in alphabetical order
c) Recognizing handwritten digits
d) Storing information in a database

(iii) 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

(iv) Indicate the type of data can be represented by a straight line in a scatter plot.

a) Linear data
b) Non-linear data
c) Categorical data
d) Ordinal data

(v) 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

(vi) Identify the type of regression that is suitable for predicting a continuous outcome using a single predictor variable.

a) Univariate linear regression
b) Multivariate linear regression
c) Logistic regression
d) Ridge regression

(vii) In multivariate linear regression, indicate the number of predictor variables used to predict the outcome.

a) One
b) Two
c) Three or more
d) None

(viii) Identify the cost function that measures in linear regression.

a) The accuracy of the model
b) The difference between predicted and actual values
c) The number of features
d) The learning rate

(ix) Choose an optimization algorithm that is commonly used to minimize the cost function in linear regression.

a) Newton's method
b) K-means
c) Gradient descent
d) Expectation-Maximization (EM)

(x) Choose a role of learning rate in gradient descent

a) It controls the speed at which the algorithm learns
b) It determines the number of iterations
c) It sets the initial value of the cost function
d) It specifies the number of features

(xi) In supervised learning, select the main objective.

a) Minimize the prediction error
b) Maximize the reward function
c) Classify unlabeled data
d) Learn from labeled data to make predictions

(xii) Tell SVM stands for machine learning.

a) Supervised Vector Machine
b) Support Vector Machine
c) Standard Vector Machine
d) Sequential Vector Machine

(xiii) Support vectors in SVM defines

a) Data points that lie closest to the hyperplane
b) Data points that are farthest from the hyperplane
c) Data points with the highest weights in the model
d) Data points used only in linear SVM

(xiv) The hyperplane in SVM defines

a) A plane that separates support vectors
b) A plane that separates classes in feature space
c) A line that connects support vectors
d) A line that connects all data points

(xv) The marginal distance infer in SVM

a) The distance between support vectors and the hyperplane
b) The distance between the decision boundary and data points
c) The distance between classes in feature space
d) The distance between neighboring data points

Group-B
(Short Answer Type Questions) 3 x 5=15

2. Define K-Means Clustering. (3)

3. Describe types of linear regression. (3)

4. Explain the working of machine learning. (3)

5. Define Mean Squired Error (MSE) cost function. (3)

6. Explain Sigmoid Activation Function with example. (3)

OR

Explain Tanh (Hyperbolic Tangent) Activation Function with example. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. Explain Association Rule Learning with an example. (5)

8. Illustrate a scenario where both Reinforcement Learning (RL) and Semi-supervised Learning (SSL) can be applied together. (5)

9. Describe classification with an example. (5)

10. Describe Univariate Linear Regression and Multivariate Linear Regression. (5)

11. Illustrate comparison between K-Means, DBSCAN, Hierarchical Clustering, and Association Rule Learning. (5)

12. (5)

Explain the process of calculation of Average Silhouette Score for the data set given below:

A(1,2), B(1,4), C(1,0), D(4,2), E(4,4), F(4,0).

OR

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)