



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Sc.(ANCS)-Hons-2023

Course Name – Artificial Intelligence and Machine Learning

Course Code - BNC60205

(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) Identify the correct definition of an intelligent agent.

- | | |
|-------------------------------|---|
| a) A system that stores rules | b) An entity that perceives and acts on environment |
| c) A static program | d) A data processor |

(ii) Identify the meaning of state space in AI problem solving.

- | | |
|-------------------|-------------------------------|
| a) Set of rules | b) Set of goals |
| c) Set of actions | d) Set of all possible states |

(iii) Identify the purpose of 'Variance' in statistics.

- | | |
|---|---|
| a) To find the most frequent value in a set | b) To measure the spread of data points from the mean |
| c) To calculate the total sum of all values | d) To find the middle value in a sequence |

(iv) Determine the Median for the dataset: {3, 9, 1, 7, 5}.

- | | |
|------|------|
| a) 5 | b) 3 |
| c) 7 | d) 1 |

(v) Which algorithm is primarily used for decision tree building?

- | | |
|--------|-----------|
| a) SVM | b) KNN |
| c) ID3 | d) DBSCAN |

(vi) Which type of tree is specifically used to predict continuous numerical values?

- | | |
|------------------------|--------------------|
| a) Classification Tree | b) Regression Tree |
| c) ID3 Tree | d) Binary Tree |

(vii) What is the primary goal of Unsupervised Learning?

- | | |
|------------------------------------|--|
| a) Predicting target labels | b) Discovering hidden patterns or structures |
| c) Minimizing classification error | d) Mapping inputs to known outputs |

(viii) Which metric is commonly used to check the validity and separation of clusters?

- | | |
|---------------------|------------|
| a) Silhouette Score | b) Entropy |
|---------------------|------------|

- c) R-squared
(ix) Which algorithm is an example of 'Partitional Clustering'?
a) Hierarchical
c) K-Means
(x) What is a regression residual?
a) The predicted value
c) The sum of all inputs
(xi) Which algorithm is used for market basket analysis?
a) K-Means
c) DBSCAN
(xii) What is the main assumption for Multiple Linear Regression?
a) No relationship between variables
c) Residuals must be skewed
(xiii) What is 'Backpropagation' used for in ANNs?
a) Setting inputs
c) Visualization
(xiv) What is 'Crossover Rate' in GAs?
a) Speed of execution
c) Number of mutations
(xv) What is the role of 'Inversion' in genetic modeling?
a) Reverse substring order
c) Doubling score
- d) P-value
b) DBSCAN
d) ID3
b) The difference between the actual and predicted value
d) The learning rate
b) Apriori
d) Decision Tree
b) A linear relationship exists between target and predictors
d) High multicollinearity is required
b) Updating weights
d) Deleting neurons
b) Probability of crossover
d) Fitness score
b) Deleting chromosome
d) Changing input

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Discuss the use of CNF, DNF, syntax, and semantics in logic systems. (3)
3. Apply the concept of polynomial curve fitting to solve a real-world data problem. (3)
4. Define the term "State Space" in AI. (3)
5. Explain the "Backpropagation" algorithm. (3)
6. Justify the use of SVM over Logistic Regression for high-dimensional data. (3)

OR

- Critique the "Hill Climbing" search in a landscape with many local maxima. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Discuss the role and basic architecture of an ANN in AI. (5)
8. Evaluate the ethical implications of AI in healthcare. (5)
9. Propose a "Cross-Validation" plan for a small dataset. (5)
10. Explain Bayes' Rule in Machine Learning classification. (5)
11. Design a "Genetic Algorithm" to solve the Traveling Salesman Problem (TSP). (5)
12. Analyze "Bias-Variance Tradeoff" in Machine Learning. (5)

OR

- Distinguish between "Parametric" and "Non-Parametric" models. (5)
