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BT–8/M-24 **48309**

ARTIFICIAL INTELLIGENCE

Paper–ECP–21A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) What is Artificial Intelligence? Give an overview of its application areas.

   (b) What is logistic regression and how does it differ from linear regression? What are the assumptions underlying logistic regression?

2. (a) How does the Naïve Bayes classifier handle categorical features?

   (b) How does SVM handle non-linearly separable data? Discuss.

UNIT–II

3. (a) How does the K-Means algorithm work? What are the advantages and disadvantages of the K-Means algorithm?

(b) How does dimensionality reduction help in detecting patterns in unsupervised learning?

4. (a) What techniques can be used for feature selection in multivariable regression? Discuss.

(b) What are the key assumptions of linear regression? How do you evaluate the performance of a regression model?

UNIT–III

5. (a) What is a Genetic Algorithm (GA) and how does it differ from traditional optimization algorithms?

(b) How do crossover and mutation operations contribute to generating diverse bit patterns?

6. (a) How do colorspaces like HSV or YUV aid in object tracking? What are the advantages of using colorspaces for object tracking?

(b) How can adaptive background subtraction improve object tracking?

UNIT–IV

7. (a) What is a Perceptron and how does it work? How do you train a Perceptron to classify linearly separable data?

(b) How is the Exploration-Exploitation trade-off managed in Reinforcement Learning?

8. (a) How are State, Reward and Policy defined in a Reinforcement Learning problem?

(b) How is back propagation used to train multilayer Neural Networks? Discuss.