Reg. No. : E N G G T R E E . C O M

Question Paper Code : 41524

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Sixth/Seventh Semester

Civil Engineering

OCS 351 – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FUNDAMENTALS

(Common to : Aeronautical Engineerings/Aerospace Engineering/Automobile Engineering/ Electrical and Electronic Engineering/Electronics and Instrumentation Engineering/ Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Petrochemcial Engineering/Production Engineering/Robotics and Automation/Safety and Fire Engineering/Agricultural Engineering/Bio Technology/Biotechnology and Biochemical Engineering/Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/Handloom and Textile Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Textile Chemistry/Textile Technology)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term goal formulation and problem formulation.
2. List the steps involved in simple problem-solving agent.
3. Define Greedy Best First Search.
4. How can minimax also be extended for game of chance?
5. What is class imbalance in Machine learning?
6. Define Linear Algebra and its application in Machine Learning.

7. Define Activation function.

8. Give the formula for Navie Based classification with relevant explanation.

9. What is Clustering?

10. What are the types of Hierarchical clustering algorithms?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Enumerate Classical "Water jug Problem". Describe the state space for this problem and also give the solution. (6)

(ii) What are Intelligent Agents and its characteristics and describe the architecture of the Intelligent Agents. (7)

Or

(b) Interpret any three uninformed search strategies.

12. (a) Explain the A* search and give the proof of optimality of A*.

Or

(b) Discuss about constraint satisfaction problem with an algorithm for solving a crypt arithmetic problem.

13. (a) (i) What is Cross-Validation. Explain the various methods of Cross- Validation? (7)

(ii) Explain Overfitting and Underfitting with appropriate data set examples. (6)

Or

(b) Explain Bayes theorem and conditional probability.

14. (a) (i) Draw the architecture of a Single Layer Perceptron (SLP) and explain its operation. Mention its advantages and disadvantages. (6)

(ii) Explain CART algorithm in detail. (7)

Or

(b) Explain Decision Tree Classification algorithm with an example and illustrate Gini Impurity.

15. (a) (i) List the applications of clustering and identify advantages and disadvantages of clustering algorithm. (6)

(ii) Explain the concepts of clustering approaches. How does it differ from classification. (7)

Or

(b) How can neural networks be used in manufacturing industry explain the steps in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Solve the following Crypt arithmetic problem using constraints satisfaction.

Search procedure

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Or

(b) Using K-means Euclidean Distance Algorithm method find clusters for the following.

	A	B	C	D
X	1	2	4	5
Y	1	1	3	4