

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR (GIET UNIVERSITY)



B. Tech (Third Semester - Regular) Examinations, November – 2024
23BCMPE23011 – Artificial Intelligence and Expert Systems
(CSE-AIML)

Time: 3 hrs

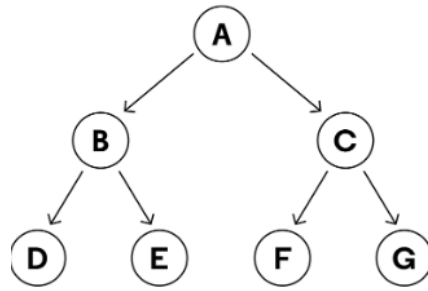
Maximum: 60 Marks

Answer ALL questions**(The figures in the right hand margin indicate marks)****PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

- | | CO # | Blooms Level |
|--|------|--------------|
| a. Identify the PEAS description of the task environment for an Internet shopping agent? | CO1 | K3 |
| b. Point out the key difference between Procedural and Declarative Knowledge | CO2 | K2 |
| c. Express the meaning of the following logical notation:
$(\forall x) \text{Child}(x) \Rightarrow \text{likes}(x, \text{Icecream})$
$(\exists x) (\text{boy}(x) \wedge (\forall y) (\text{girl}(y) \rightarrow \text{taller}(x, y)))$ | CO3 | K3 |
| d. Depict the general model of learning in a visual format. | CO4 | K1 |
| e. Cite the advantages of using an Expert System Shell for developing expert systems. | CO5 | K2 |

PART – B**(10 x 5 = 50 Marks)**Answer **ALL** the questions

- | | Marks | CO # | Blooms Level |
|--|-------|------|--------------|
| 2. a. Analyze and identify the characteristics of each of the following task environments:
i. Medical Diagnosis
ii. Image Analysis
iii. Crossword Puzzle
iv. Interactive English Tutor | 5 | CO1 | K3 |
| b. Explain the structure of AI agents and how they function in different environments. | 5 | CO1 | K2 |
| (OR) | | | |
| c. Formulate a state-space representation to solve the Water Jug Problem using two jugs with capacities of 4 liters and 3 liters. | 5 | CO1 | K3 |
| d. Discuss about the various types of production systems by highlighting their characteristics. | 5 | CO1 | K2 |
| 3.a. Translate the following English Sentences into First-Order Logic FOL using quantifier.
• All birds fly.
• Some boys play cricket.
• Not all students like both Mathematics and Science
• Elakkiyaa is a sister of Srinika and Eyuva | 5 | CO2 | K3 |
| b. Provide examples to illustrate Instance relationships and ISA relationships in knowledge representation. | 5 | CO2 | K2 |
| (OR) | | | |
| c. For the given graph, trace the BFS and DFS traversal order starting from node A. | 5 | CO2 | K3 |



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|------|--|---|-----|----|
| d. | Create a table highlighting the key differences between Forward Reasoning and Backward Reasoning in rule-based systems. | 5 | CO2 | K2 |
| 4.a. | Apply the minimax algorithm to solve a Tic-Tac-Toe game. | 5 | CO3 | K3 |
| b. | Explain the application of a planning system to the blocks-world domain, emphasizing its key processes. | 5 | CO3 | K2 |
| (OR) | | | | |
| c. | Solve the cryptarithmic problem SEND + MORE = MONEY as a Constraint Satisfaction Problem (CSP). Find the value of M + O + N + E + Y? | 5 | CO3 | K3 |
| d. | Provide an overview of the key components of Hierarchical Planning. | 5 | CO3 | K2 |
| 5.a. | Describe the key steps in Natural Language Processing (NLP) in understanding human language. | 5 | CO4 | K2 |
| b. | Apply discourse and pragmatic processing techniques to interpret the meaning in a dialogue sentence. | 5 | CO4 | K2 |
| (OR) | | | | |
| c. | Briefly describe the five primary methods of learning, considering the context and type of material. | 5 | CO4 | K2 |
| d. | Outline the basic steps involved in the Perceptron Learning Algorithm. | 5 | CO4 | K2 |
| 6.a. | With the neat block diagram, describe about the key components of an expert system. | 5 | CO5 | K2 |
| b. | Examine the different types of expert systems in AI, focusing on their key features. | 5 | CO5 | K2 |
| (OR) | | | | |
| c. | Discuss the key stages of the knowledge acquisition process in expert systems. | 5 | CO5 | K2 |
| d. | Highlight the concept of semantic networks in expert systems for knowledge representation. | 5 | CO5 | K2 |

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