Hall Ticket No | | | | | | | | | | |

Question Paper Code: AITC26

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2023
Regulation: UG-20

PRINCIPLES OF ARTIFICIAL INTELLIGENCE

Time: 3 Hours **(COMMON TO CSIT | IT)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What is artificial intelligence (AI)? Explain how an AI system is different from a conventional computing system? [BL: Understand| CO: 1|Marks: 7]

   (b) Write a short note on approaches to knowledge representation. List the steps associated with the knowledge engineering process and explain in detail. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) How to combine forward and backward reasoning? Explain. Differentiate procedural knowledge and declarative knowledge. [BL: Understand| CO: 2|Marks: 7]

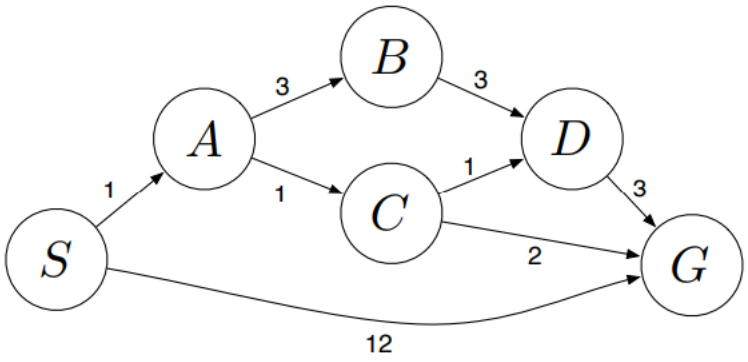
   (b) Illustrate the representation of the following in predicate logic with an example
   i) 'instance' and 'isa' relationship
   ii) Adding exception
   iii) Computable functions [BL: Understand| CO: 4|Marks: 7]

MODULE – III

3. (a) Write a note on Generate-and-test approach. Describe potential advantages and disadvantages of using hill climbing to solve a state search problem. [BL: Understand| CO: 3|Marks: 7]

   (b) Answer the following questions about the search problem shown in Figure 1. Break any ties alphabetically. For the questions that ask for a path, please give your answers in the form 'S – A –D – G.'

Figure 1



i) What path would breadth-first graph search return for this search problem?

ii) What path would uniform cost graph search return for this search problem?

iii) What path would depth-first graph search return for this search problem?

iv) What path would A* graph search, using a consistent heuristic, return for this search problem? [BL: Understand| CO: 4|Marks: 7]

[BL: Apply| CO: 3|Marks: 7]

4. (a) Explain with an algorithm and example the following :

i) Minimax algorithm

ii) Alpha-Beta Pruning [BL: Understand| CO: 4|Marks: 7]

(b) Develop a game tree with the steps involved for the depth 3 and branching factor 3 using alpha-beta pruning algorithm.. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Outline the properties of fuzzy sets. Mention the difference between monotonic and non-monotonic reasoning. [BL: Understand| CO: 5|Marks: 7]

(b) Discuss the ethical implications of using nonmonotonic reasoning in AI systems. How might incorrect or biased defaults lead to unintended consequences, and how can these issues be minimized? [BL: Understand| CO: 5|Marks: 7]

6. (a) Classify different types of logics used for nonmonotonic reasoning and explain with suitable examples. [BL: Understand| CO: 5|Marks: 7]

(b) Describe the concept of certainty factors and how they are used in rule-based systems to handle uncertainty.

[BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) What is reinforcement learning? Explain

i) Passive reinforcement learning

ii) Active reinforcement learning [BL: Understand| CO: 6|Marks: 7]

(b) Contrast the features of non-linear planning strategies. Illustrate with an example the working of goal set method [BL: Understand| CO: 6|Marks: 7]

8. (a) List the three core elements of adaptive learning systems. Discuss expert system and mention its characteristics. [BL: Understand| CO: 6|Marks: 7]

(b) Summarize ROTE learning. How does learning by taking advice differ from rote learning? Provide an example. [BL: Understand| CO: 6|Marks: 7]

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