No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 43203 | Roll No. | 1 | 2 | 4 | 0 | 4 | 3 | 2 | 2 | 6 | 6 |

B. Tech Examination 2024-25

(Even Semester)

BASICS OF ARTIFICIAL INTELLIGENCE

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $1 \times 8 = 8$

   (a) What type of agent can learn from its environment?

   (b) Define the term "path cost".

   (c) What is the main advantage of using a heuristic in search?

   (d) What kind of problems are suitable for local search?

   (e) What is the purpose of the minimax algorithm?

(f) What is "alpha" in Alpha-Beta pruning?

(g) What is the game tree?

(h) What is conditional probability?

SECTION – B

2. Attempt any two parts of the following : $6 \times 2 = 12$

(a) Define artificial intelligence. Explain the following terminologies with examples :

rational agent, environment, percept, actuator, and task envrionment.

(b) What is soft computing? Discuss its components and advantages over traditional (hard) computing techniques.

(c) Explain local and global search techniques used for solving optimization problems. Discuss hill climbing and simulated annealing in this context.

(d) Discuss any three real-world applications of AI. What are some emerging trends that define the future of AI?

SECTION – C

Note:- Attempt any two parts from each question. Each part carries equal marks. $8 \times 5 = 40$

3. (a) Differentiate between narrow AI and super AI with examples. Discuss their capabilities and current status.

   (b) Explain the concept of fuzzy sets with suitable examples. Describe any one operations performed on fuzzy sets.

   (c) Describe the structure and types of intelligent agents. How does each type adapt to environments?

4. (a) Describe the components of a search problem with an example from a real-world scenario.

   (b) Compare and contrast informed and uninformed search strategies. Provide examples of each.

   (c) Describe how game trees are used in AI decision-making in games.

5. (a) Explain the concept of Alpha-Beta pruning. Illustrate with an example how it improves the efficiency of the minimax algorithm.

(b) Explain any two knowledge representation techniques and discuss their importance in reasoning.

(c) Compare first order logic with propositional logic and explain the roles of constants, variables, predicates, and quantifiers.

6. (a) Differentiate between forward and backward chaining. Explain each with a flow diagram and a suitable example.

(b) Explain how it handles uncertainty in AI with reference to conditional probability and Bayesian reasoning.

(c) What are the ethical concerns associated with AI? How does AI impact employment, privacy, and decision-making in society.

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