

Exam. Code: 0923  
Sub. Code: 33552

2125

B.E. (Information Technology)-Fifth Semester  
PCIT-502: Artificial Intelligence

Time allowed: 3 Hours

Max. Marks: 50

*NOTE: Attempt five questions in all, including Question No. I (Section-A) which is compulsory and selecting two questions each from Section-B-C. Any missing or misprinted data maybe assumed suitably. All questions carry equal marks.*

x-x-x

Section-A

I.

[2 x 5

- a. What distinguishes Artificial Intelligence from traditional computer programming? Give one example where AI is preferable.
- b. What is 'state space search' in the context of Artificial Intelligence, and why is it important for problem solving?
- c. Define an intelligent agent. What are the main components that enable an agent to perceive and act within its environment?
- d. Explain how the concept of non-monotonic reasoning differs from traditional logic and why it's important in building realistic AI systems.
- e. Explain the concept of a Fuzzy Set and the Membership Function.

Section B

- II. a) Describe the major milestones in the development of Artificial Intelligence, from its conceptual origins to current state-of-the-art technologies. How have these milestones shaped the direction of AI research and development?  
b) Suppose an agent is using the hill climbing algorithm to solve a puzzle. If the algorithm reaches a state where all neighbouring states have lower values, what action does the agent take next? How can this limitation be addressed?
- III. a) Describe the A\* search algorithm. How Underestimation can influence this algorithm. Discuss using a suitable example.  
b) How does **alpha-beta** pruning improve the efficiency of the minimax algorithm? What happens if this mechanism is not used?
- IV. a) Compare Semantic net to frames in terms of structure and usability for knowledge representation. Illustrate how the knowledge "A bird named Robin is a type of flying creature, and it has wings" would be structured in Semantic Net.  
b) Differentiate between Procedural Knowledge and Declarative Knowledge in AI.

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**Section C**

- V. a) Consider an Intelligent Agent managing traffic lights at a complex intersection. Discuss whether a utility-based agent or any other type of agent would be more suitable, justifying your choice based on the environment's characteristics.
- b) Explain how planning graphs can be used to improve the efficiency of planning algorithms.
- VI. a) Explain the concept of non-monotonic reasoning. Give an example to illustrate a scenario where non-monotonic reasoning is necessary. Illustrate a common scenario of Default Reasoning and explain how a contradiction is resolved when new, specific information is acquired.
- b) Discuss the differences between Dempster-Shafer theory and traditional probability theory. In what kind of applications is Dempster-Shafer theory more suitable?
- VII. a) Discuss the challenges involved in developing and maintaining the knowledge base of an expert system, including strategies to handle uncertainty and updates to the knowledge base over time.
- b) Explain the process of Inductive Learning using Decision Trees. What criteria are typically used to select the best attribute for splitting a node, and why is this choice crucial?

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