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Course Code

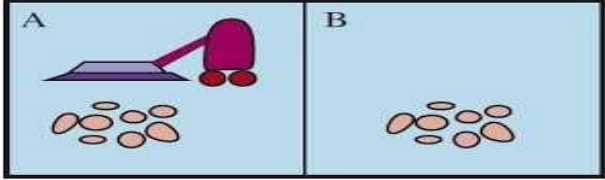
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Fifth Semester B.E. Degree Examinations, April/May 2024
PRINCIPLES OF ARTIFICIAL INTELLIGENCE

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
MODULE – 1			
1.	a. Define in your own words: (i) Intelligence (ii) Artificial intelligence (iii) Agent (iv) Rationality	04	(2:1:1.3.1)
	b. Show that the simple vacuum cleaner agent shown in Fig. Q1(b) is indeed rational with suitable assumptions.	06	(4:3:2.1.1)
			Fig. Q1(b)
	c. Write short note on history of artificial intelligence starting from the gestation to the current development to the AI in itself.	10	(3:1:1.3.1)
(OR)			
2.	a. Show at-least two points of difference between: (i) Systems that thinks like human and systems that acts like human. (ii) Systems that thinks rationally and systems that acts rationally.	06	(4:3:2.1.1)
	b. Show that the 4 puzzle states are divided into disjoint sets. Devise a procedure to decide which set a given state is in, and explain how it generates random states.	10	(4:3:2.1.1)
	c. What is an agent? Explain different kinds of agent programs that embody the principles as intelligent systems.	04	(2:1:1.3.1)
MODULE-2			
3.	a. Explain why problem formulation must follow goal formulation. Explain with a simple problem solving agent function.	04	(2:2:1.3.1)
	b. How does depth-first search work, and what are its advantages and disadvantages.	10	(5:3:3.1.1)
	c. Explain the difference between informed and uninformed search algorithms.	06	(4:3:1.3.1)
(OR)			
4.	a. Write short notes on N-queens problem with different states and actions.	04	(2:2:1.3.1)
	b. How does iterative deepening depth first search address some of the limitations of regular depth first search?	10	(5:3:3.1.1)
	c. Compare and contrast uniform cost search and depth first search algorithms in AI.	06	(4:3:1.3.1)

MODULE-3

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| 5. | a. | Provide a step by step walk through of greedy best first search and A* search applied to a specific AI problem. Include the start state, goal state and the selected node at each step. | 10 | (5:3:4.1.2) |
| | b. | Define heuristic function in the context of search algorithms. How do they contribute to the efficiency of informed search strategy? | 06 | (3:3:1.3.1) |
| | C. | Explain the process of inference engine in the knowledge based agent. How do they draw conclusions from the knowledge they possess. | 04 | (3:3:3.1.1) |

(OR)

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| 6. | a. | Compare greedy best first search with other informed search algorithms highlighting its strengths and weakness. | 04 | (3:3:3.1.1) |
| | b. | What is a wumpus world, how does it relate to AI? Discuss the reasoning involved in making decisions within the wumpus world. | 10 | (5:3:4.1.2) |
| | C. | What is propositional logic? Explain the basic components of propositional logic? Describe the process of converting English sentences into propositional logic statements. | 06 | (3:3:1.3.1) |

MODULE-4

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| 7. | a. | Explain the basic components of predicate logic, such as predicates, variables and quantifiers. | 06 | (3:3:1.3.1) |
| | b. | Explain the Modus Ponens and Modus Tollens inference rules in the context of predicate logic. | 10 | (5:4:4.1.2) |
| | C. | Describe the process of applying the resolution rule in predicate logic. | 04 | (3:4:3.1.1) |

(OR)

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| 8. | a. | What is predicate logic? How does it extend propositional logic? | 06 | (3:3:1.3.1) |
| | b. | Explain the concept of existential instantiation and how it is used in predicate logic? | 10 | (5:4:4.1.2) |
| | C. | How forward chaining and backward chaining is applied in predicate logic reasoning? | 04 | (3:4:3.1.1) |

MODULE – 5

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| 9. | a. | Discuss the role of probability theory in modelling uncertain knowledge. | 06 | (3:3:1.3.1) |
| | b. | Discuss few real world applications where reasoning under uncertainty is critical in AI? | 10 | (5:5:4.1.2) |
| | C. | How does uncertainty manifest in knowledge representation in AI. | 04 | (3:4:3.1.1) |

(OR)

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| 10. | a. | How does Bayesian reasoning contribute to managing uncertainty in decision making processes? | 06 | (3:5:1.3.1) |
| | b. | Discuss the challenges associated with reasoning under uncertainty in AI systems? | 10 | (5:5:4.1.2) |
| | C. | Explain the difference between uncertainty due to imprecision and uncertainty due to incompleteness in knowledge? | 04 | (3:5:3.1.1) |

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