DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech Branch : Computer Engineering/Computer Science and Engineering

Semester :VII

Subject Code & Name: BTCOC701 & Artificial Intelligence

Max Marks: 60 Date: 05/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/ CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	What is the primary goal of Artificial Intelligence (AI)?		1
	a. To create software that operates without user input / b. To develop machines that think and act rationally / c. To replace all human jobs with robots / d. To simulate physical environments in virtual reality		
2	Which of the following best describes an intelligent agent?		1
	a. A system that solves all problems independently / b. A system that perceives its environment and takes actions to achieve goals / c. A system that operates only in controlled environments / d. A static program designed for a specific task		
3	Which type of environment is the easiest for an AI agent to operate in?		1
	a. Fully observable / b. Partially observable / c. Dynamic and multi-agent / d. Partially observable and		

	and deterministic	and stochastic		continuous		
4	Which component of an AI agent determines how it takes actions?					1
	a. Sensors	b. Actuators	c. Performance measure	d. Agent program		
5	Which search strategy expands nodes level by level without considering path cost?					1
	a. Depth-first search	b. Uniform-cost search	c. Breadth-first search	d. Greedy best-first search		
6	What is the primary difference between uninformed and informed search strategies?					1
	a. Informed search strategies use a goal test	b. Informed search strategies use heuristic information	c. Uninformed search strategies are faster	d. Uninformed search strategies use a cost function		
7	Which of the following is an example of a heuristic function in AI?					1
	a. The shortest path in a graph	b. The Manhattan distance in a grid problem	c. A binary search algorithm	d. A depth-first traversal		
8	Which approach to knowledge representation uses graphs or networks to capture relationships?					1
	a. Semantic networks	b. Predicate logic	c. Rule-based systems	d. Procedural knowledge		
9	Which reasoning approach works backward from the goal to determine the necessary steps?					1
	a. Forward reasoning	b. Backward reasoning	c. Deductive reasoning	d. Inductive reasoning		
10	What is the primary purpose of Bayesian networks in AI?					1
	a. To represent deterministic relationships	b. To handle reasoning under	c. To perform hierarchical	d. To implement goal stack planning		

	between variables	uncertainty	planning			
11	What is the key characteristic of goal stack planning?					1
	a. Tasks are solved in parallel	b. Goals are achieved one by one, using a stack to track them	c. It uses probabilistic reasoning to determine actions	d. It focuses on minimizing uncertainty in knowledge		
12	Which level of natural language processing focuses on sentence context and speaker intentions?					1
	a. Syntactic processing	b. Semantic analysis	c. Discourse and pragmatic processing	d. Morphological processing		
Q. 2	**Solve the following.**					**12**
A)	Define what an intelligent agent is and describe its components. Provide example of an intelligent agent & explain how it interacts with its environment.					**6**
B)	Define rationality in detail & discuss the impact of different types of environments in terms of deterministic vs. stochastic, fully vs. partially observable on rational decision-making.					**6**
Q.3	**Solve the following.**					**12**
A)	Define and explain the functionality of a goal-based agent**.**					**6**
B)	What is state space searching? What are the main differences between uninformed and informed search strategies?					**6**
Q. 4	**Solve Any Two of the following.**					**12**
A)	What is a utility-based agent, and how is it different from a goal-based agent?					**6**
B)	What is a constraint satisfaction problem (CSP)? Define it and provide examples of CSPs in real-world applications.					**6**
C)	Explain Alpha-Beta pruning algorithm with suitable example.					**6**
Q.5	**Solve Any Two of the following.**					**12**
A)	What is Quantifier? Differentiate in between universal quantifier & Existential quantifier with its example.					**6**

B)	Represent the following relationships using ISA notation: i. "A poodle is a type of dog." ii. "A dog is a type of mammal."		**6**
C)	Explain what a Bayesian network is. How does it represent probabilistic relationships among variables?		**6**
Q. 6	**Solve Any Two of the following.**		**12**
A)	Given fuzzy sets: Set U={5,10,20,25,30,40} Set A={(10,0.2),(20,0.4), (25,0.7), (30,0.9), (40,1)} Set B={(10,0.4),(20,0.1),(25,0.9),(30,02),(40,0.6)} Calculate the union, Intersection, Complement of A & B		**6**
B)	What is syntactic processing in natural language? Explain its importance in understanding language.		**6**
C)	What is inductive learning? Give an example of how it can be applied in machine learning.		**6**
	***** End *****		