OR	iii	Differentiate between forward reasoning and backward reasoning techniques. Provide examples to illustrate the application of each technique in problem-solving.	**6**	**2**	**2**
Q.6		Attempt any two:			
	i.	Explain the minimax algorithm in the context of game playing. Discuss its working principle and its application in determining optimal moves in two-player zero-sum games.	**5**	**2**	**2**
	ii.	Define the block world problem in the context of robotics. Explain the objective and constraints of the problem.	**5**	**2**	**2**
	iii.	Define probabilistic reasoning and discuss its role in handling uncertain knowledge in AI systems.	**5**	**2**	**2**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

MEDICAPS UNIVERSITY

Faculty of Engineering
End Sem Examination May 2025
EC3ET01 Artificial Intelligence

Programme: B.Tech. Branch/Specialisation: EC

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**CO**	**BL**
Q.1	i.	Which of the following is not a characteristic of a production system in AI? (a) Knowledge representation (b) Search strategy (c) Random decision making (d) Inference mechanism	**1**	**1**	**1**
	ii.	Which of the following is not a subfield of Artificial Intelligence? (a) Machine Learning (b) Natural language processing (c) Robotics (d) Data Warehousing	**1**	**1**	**1**
	iii.	In Hill-climbing search, which of the following best describes its basic strategy? (a) Always move to the node with the lowest heuristic value. (b) Always move to the node with the highest heuristic value. (c) Move randomly to explore the search space. (d) Move based on a predefined pattern.	**1**	**2**	**2**
	iv.	What is the primary goal of optimization? (a) Maximizing the number of parameters (b) Minimizing or maximizing an objective function (c) Reducing the complexity of algorithms (d) Randomly selecting solutions	**1**	**2**	**2**

v.	In a semantic network, what do nodes typically represent. (a) Words or concepts (b) Images or sounds (c) Numbers or equations (d) Sentences or paragraphs		**1**	**2**	**2**
vi.	What type of representation does conceptual dependency use to represent knowledge? (a) Frames (b) Neural network (c) Semantic networks (d) Propositional calculus		**1**	**2**	**2**
vii.	Bayes' Theorem is based on- (a) Conditional probability. (b) Regression analysis. (c) Gradient descent. (d) Principal component analysis.		**1**	**1**	**1**
viii.	In a decision tree, what type of nodes represent decision points. (a) Terminal nodes (b) Leaf nodes (c) Root nodes (d) Internal nodes		**1**	**1**	**1**
ix.	Which of the following is a common approach to solving the block world problem? (a) Reinforcement learning (b) Genetic algorithms (c) Constraint satisfaction (d) Fuzzy logic		**1**	**1**	**1**
x.	What is the primary objective of game-playing techniques in artificial intelligence? (a) To maximize the game's complexity (b) To minimize the game's duration (c) To develop strategies for winning games (d) To optimize the game's graphics		**1**	**1**	**1**
Q.2	i.	Define artificial intelligence and explain its importance in modern society	**2**	**1**	**1**
	ii.	Explain the difference between supervised and unsupervised learning with examples.	**3**	**1**	**1**

	iii.	What is the difference between breadth-first search and depth-first search algorithms? Provide examples to illustrate.	**5**	**2**	**2**
OR	iv.	What is a production system in the context of artificial intelligence? Explain the structure and components of a production system.	**5**	**2**	**2**
Q.3	i.	Define heuristic functions in the context of optimization problems.	**2**	**1**	**1**
	ii.	Describe the working of the A* search algorithm with the help of an example. Discuss its advantages over other search algorithms.	**8**	**2**	**2**
OR	iii.	Discuss the Hill-Climbing search algorithm. Explain how it works and provide an example to illustrate its operation. Highlight its advantages and limitations.	**8**	**2**	**2**
Q.4	i.	Define Inferencing in knowledge representation.	**3**	**1**	**1**
	ii.	Describe the following knowledge representation structures- (a) Scripts (b) Schemas (c) Frames (d) Conceptual dependency Discuss the similarities and differences between these structures and their applications in AI.	**7**	**2**	**2**
OR	iii.	Explain the concept of semantic networks as a knowledge representation structure. How are semantic networks used to represent knowledge and perform inferencing?	**7**	**2**	**2**
Q.5	i.	Describe Bayes' theorem and its significance in probabilistic reasoning.	**4**	**2**	**2**
	ii.	Define decision tree and explain how it is used for decision-making under uncertainty. Provide an example of a decision tree and discuss its construction and interpretation.	**6**	**2**	**2**

Marking Scheme

EC3ET01 (T) Artificial Intelligence (T)

Q.1	i)	**C) Random decision making**	**1**
	ii)	**d) Data Warehousing**	**1**
	iii)	**b) Always move to the node with the highest heuristic value.**	**1**
	iv)	**b) Minimizing or maximizing an objective function**	**1**
	v)	**a) Words or concepts**	**1**
	vi)	**a) Frames**	**1**
	vii)	**a) Conditional probability.**	**1**
	viii)	**d) Internal nodes**	**1**
	ix)	**a) Reinforcement learning**	**1**
	x)	**c) To develop strategies for winning games**	**1**
Q.2	i.	1 marks for definition and 1 marks for importance.	**2**
	ii.	1 marks for each difference with example	**3**
	iii.	3 marks for difference and 2 mark for example.	**5**
OR	iv.	2 marks for definition and 3 marks for structure and components.	**5**
Q.3	i.	2 Marks for definition.	**2**
	ii.	3 marks for working 2 marks for example and 3 marks for advantage	**8**
OR	iii.	3 marks for working 2 marks for example and 3 marks for advantage	**8**
Q.4	i.	3 marks for defining	**3**
	ii.	1 marks for each structure and 3 marks for discussion of similarities and differences.	**7**
OR	iii.	4 marks for explaining concept of Semantic Networks and 3 marks for second section.	**7**
Q.5	i.	3 marks for definition and 1 mark for significance.	**4**
	ii.	4 marks for definition and 2 mark for example.	**6**
OR	iii.	4 marks for difference and 2 mark for example.	**6**
Q.6			
	i.	3 marks for definition and 2 mark for example	**5**
	ii.	3 marks for definition and 2 mark for explaining objective and constraints	**5**
	iii.	3 marks for definition and 2 mark for discuss its role in handling uncertain knowledge	**5**

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