

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 130008**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Third Semester

Computer Science and Technology

U23CT302 – ARTIFICIAL INTELLIGENCE

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	State the relationship between intelligent systems and intelligent agents.	2	K2	CO1
2.	Classify agents based on their capability to perceive and act.	2	K2	CO1
3.	Compare exhaustive and heuristic search strategies.	2	K2	CO2
4.	Why are constraint satisfaction problems important in AI applications?	2	K2	CO2
5.	State the role of AND–OR graphs in problem reduction.	2	K2	CO3
6.	Represent a simple game tree for a two-player game up to depth 2.	2	K2	CO3
7.	Mention the primary purpose of knowledge representation in AI.	2	K2	CO4
8.	Compare logic programming with imperative programming.	2	K2	CO4
9.	Outline a rule-based expert system and its basic working mechanism.	2	K2	CO5
10.	Define uncertainty measure and its importance in expert systems.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Describe the structure and working of intelligent agents. Include the PEAS representation and agent architectures.	13	K1	CO1

		(OR)			
	b)	Illustrate the general problem-solving process in AI. Explain how a problem is represented and solved in a state-space form.	13	K1	CO1
12.	a)	Explain the working of DFS and show how it differs from BFS in terms of time complexity, space complexity, and completeness. Illustrate using a suitable search tree.	13	K2	CO2
		(OR)			
	b)	Illustrate the working of the A* algorithm with an example. Discuss how the heuristic function affects its optimality.	13	K2	CO2
13.	a)	Examine how a bounded look-ahead strategy is used to manage computational limitations in game-playing agents. Provide an example.	13	K3	CO3
		(OR)			
	b)	Analyze the Alpha-Beta pruning technique applied to a Minimax tree. Show, with a diagram, how pruning reduces computational effort.	13	K3	CO3
14.	a)	Using <b>resolution refutation</b> , prove that <i>Socrates is mortal</i> from the premises given below. Show all the steps clearly. <ul style="list-style-type: none"> <li>i. All humans are mortal.</li> <li>ii. Socrates is a human.</li> </ul>	13	K2	CO4
		(OR)			
	b)	Represent the following knowledge using a semantic network and an extended semantic network: “All birds can fly except penguins; Tweety is a bird; Pingu is a penguin”. Explain inheritance and exceptions in your representation.	13	K2	CO4
15.	a)	Explain the architecture of an expert system. Describe the role of knowledge acquisition, inference engine, explanation subsystem, and user interface with an example of a domain.	13	K2	CO5
		(OR)			
	b)	Apply Bayesian belief networks to a simple problem: “A student passes an exam if they study and attend classes. Probability of studying = 0.6, attending classes = 0.7, passing exam given studying and attending classes = 0.95.” Using Bayesian reasoning, calculate the probability of the student passing the exam.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	A hospital wants an intelligent system for patient diagnosis and appointment scheduling. Justify the following questions with answer. i. Identify a suitable intelligent agent type for this scenario. ii. Represent simple medical knowledge using semantic networks or frames (3–5 diseases, symptoms, and treatments). iii. Design a rule-based expert system with 3–5 rules to assist in diagnosis. iv. Use a simple probability example to handle one uncertain symptom.	15	K2	CO5
(OR)				
b)	A robot must navigate a dynamic maze with obstacles and unknown paths. Justify the following questions with answer. i. Design and justify the choice of search algorithm for optimal path finding. ii. Apply problem reduction and bounded look-ahead strategies to divide maze into sub-goals. iii. Construct a logic programming model representing robot rules and environmental constraints. iv. Evaluate uncertainty handling using probability theory when sensor data is incomplete.	15	K2	CO2