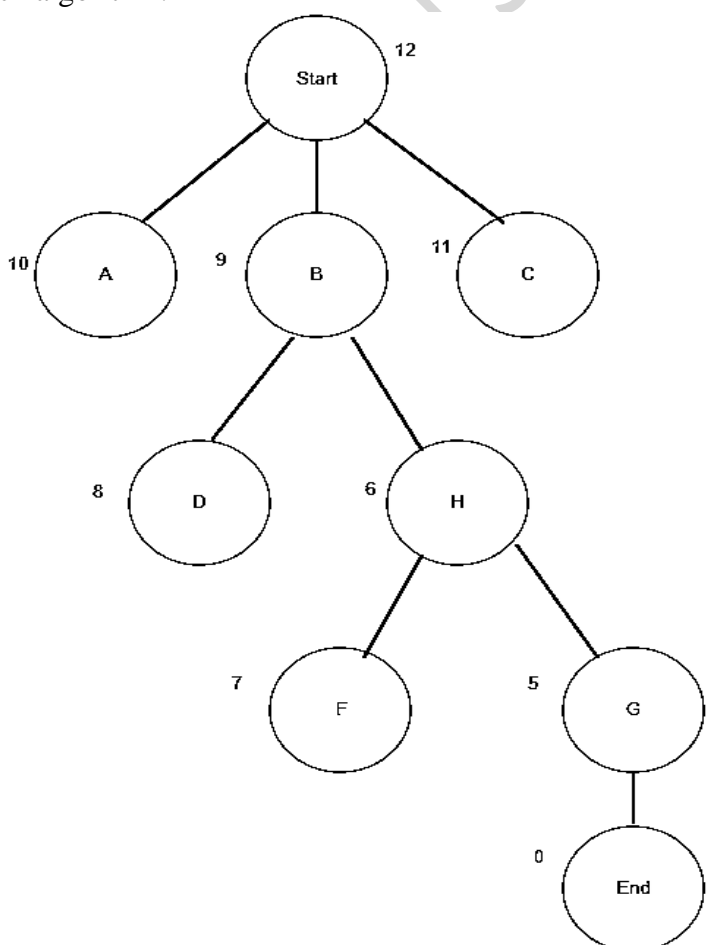# B.M.S. College of Engineering, Bengaluru-560019

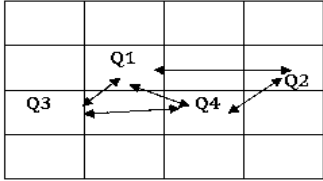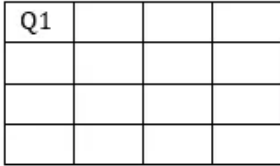### Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Electronics and Telecommunication Engineering **Duration: 3 hrs.**

Course Code: 23ET6PE2AI **Max Marks: 100**

Course: Artificial Intelligence

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Define the term 'Production System'. Analyze the methodology used for solving the 8 Queens problem with one example.	CO1	-	**10**
	b)		Solve the given 'Question answering problem' using a program that tries to answer by using only the input text. Clearly show the data structures involved for the same. Statement: "Kevin went shopping for a new pair of shoes. He found a red one that he really liked" Question 1: What did Kevin buy? Question 2: What did Kevin find that he liked? Question 3: Did Mary buy anything?	CO2	PO1	**10**
			OR			
2	a)		Explain the important aspects with respect to shift in focus of AI towards providing smarter solutions.	CO1	-	**10**
	b)		With an appropriate block diagram, explain the methodology of solving an Artificial Intelligence problem.	CO1	-	**10**
			UNIT - II			
3	a)		With relevant graphs and examples, analyze the following: i. Breadth First Search ii. Greedy Best First Search iii. Uniform Cost Search	CO2	PO1	**10**
	b)		Explain the following advanced problems of AI: i. Tower of Hanoi ii. The Missionaries and Cannibals	CO1	-	**10**
			OR			
4	a)		From the given axioms, deduce the solution that 'Marcus is dead'. 1. Marcus was a man 2. Marcus was Pompeian	CO2	PO1	**10**

		3. Marcus was born in 40 AD 4. All men are mortal 5. All Pompeian's died when the volcano erupted in 79 AD 6. No mortal lives longer than 150 years 7. It is now 2025 AD			

	b)	Define the term 'State Space'. Analyze the following terms of a State Space with relevant graph:
		    i. Local Maximum
		    ii. Global Maximum
		    iii. Plateau
		    iv. Current State
		    v. Shoulder
			CO1	-	**10**

UNIT - III

5	a)	Solve the Breadth First Search for the given 8 Puzzle problem:	CO3	PO2	**10**

2	8	3
1	6	4
7		5

→

1	2	3
8		4
7	6	5

	b)	Determine the shortest path for the given tree using Best First Search algorithm.	CO3	PO2	**10**

		OR			

6	a)	Solve the given **8 puzzle problem using A* Search.**	CO3	PO2	**10**
		Initial State **Final State**			

	b)	4 fair coins are tossed simultaneously. Develop the test vectors for this experiment using Generate and Test Algorithm such that the following conditions are met:
		  i. No 2 heads appear simultaneously after a tail
		  ii. Alternative heads and tails are not allowed
			CO3	PO2	**10**

UNIT - IV

7	a)	Solve the given graph using AO* algorithm.	CO3	PO2	**10**
	b)	Find the value of **A + B + C + D + E + F + G,** given equation: **F R E E** **+ B I R D** **= C A G E**	CO3	PO2	**10**

OR

8	a)	Explain the importance of the Simulated Annealing process in AI with relevant graph.	CO1	-	**10**

| | | b) | Solve the given 4 queens problem using Constraint Satisfaction Problem with:
    i.   Local Search approach for the given initial state:

    ii.   Backtracking and Constraint propagation approach initial state:
 | CO3 | PO2 | **10** |

			UNIT - V			

	9	a)	Implement and sketch the given prolog facts as a semantic network.
			    a. Fly (yes, bird)
			    b. Instance of (vertebrate, bird)
			    c. Feathers (yes, bird)
			    d. Fly (no, emu)
			    e. Isa (emu, ernie)
			    f. Steals potato crisps (yes, ernie)
				CO2	PO1	**10**

		b)	What is meant by Inheritable Knowledge? Describe the different semantic networks used in it. Also define the following with respect to knowledge representation:
			    i. Representational adequacy
			    ii. Inferential adequacy
			    iii. Inferential efficiency
			    iv. Acquisitional efficiency
				CO1	-	**10**

			OR			
	10	a)	Represent the statement 'Joe ate the bisibele bath with a spoon' using conceptual dependency.	CO2	PO1	**10**

		b)	Analyze the differences between forward reasoning and backward reasoning. Also find the colour of a pet named Frodo, given that it eats sings and chirps. The following four rules are considered in the rule base:
			    ▶ Rule 1: Y eats flies and Y croaks → Y is a frog.
			    ▶ Rule 2: Y sings and Y chirps → Y is a canary.
			    ▶ Rule 3: Y is a canary → Y is yellow.
			    ▶ Rule 4: Y is a frog → Y is green.
				CO2	PO1	**10**

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