U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

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

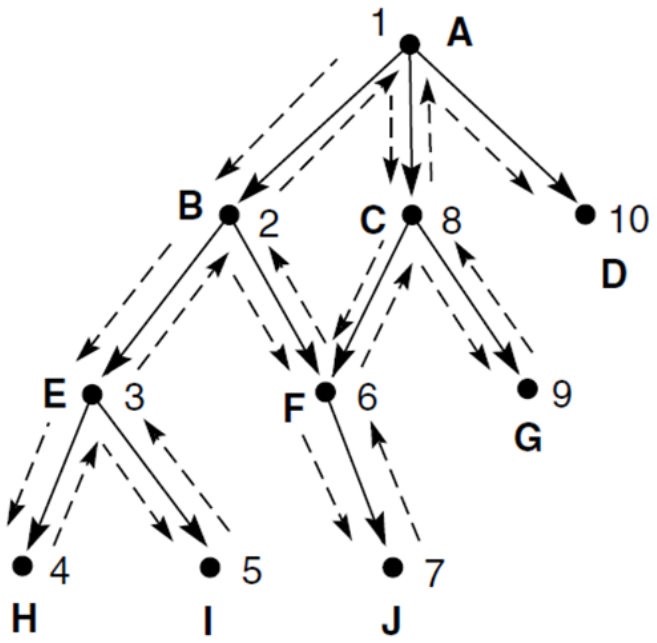
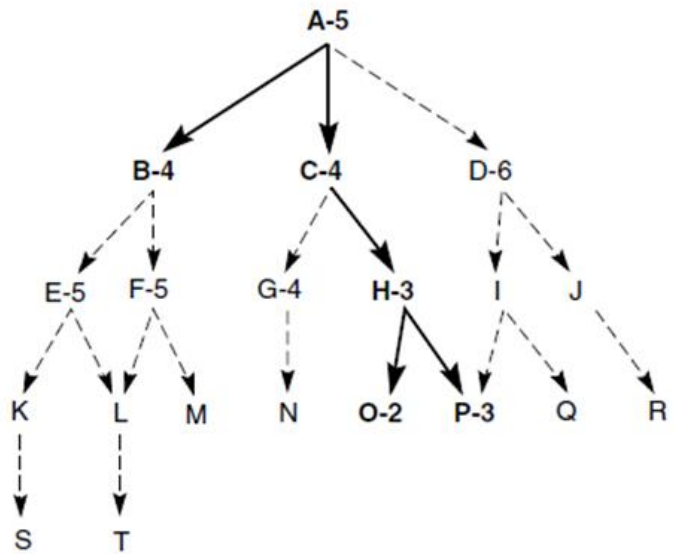
Course Code: 22EC8PE4AI **Max Marks: 100**

Course: APPLICATIONS OF AI

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

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	Define AI. Discuss the fundamental issues involved in AI and how do you achieve them?	1	-	**8**
	b)	What are the different programming methods used in AI. Explain in brief	1	-	**6**
	c)	List the current trends in AI. Explain them in brief. What are the characteristics of intelligent systems?	1	-	**6**
		OR			
2	a)	Give the classification of computer systems with an example each	1	-	**10**
	b)	Define a Fuzzy system with an example. Also the draw the block diagram representing the architecture of a fuzzy system and explain them in brief.	1	-	**10**
		UNIT - II			
3	a)	Write the equivalent predicate calculus statements for the following (i) If it doesn't rain on Monday tom will go to the mountains (ii) Emma is a Doberman pinscher and a good dog (iii) All basketball players are tall (iv) Some people like anchovies (v) If wishes were horses, beggars would ride	2	2	**10**
	b)	List the properties of propositional calculus. Demonstrate the equivalence of following statements using truth table $(\neg P \vee Q) \equiv P \Rightarrow Q$	2	2	**10**
		OR			
4	a)	Write the semantics of propositional calculus with respect to (i) Negation (ii) Conjunction (iii) Disjunction	2	2	**10**

			(iv) Implication (v) Equivalence			
		b)	What is backtracking algorithm? Apply back tracking algorithm for the following state space shown below. Develop a table consisting of current state (CS), state list (SL), new state list (NSL) and dead ends (DE) for up to 8 iterations.  	*2*	*2*	**10**
			UNIT - III			
	5	a)	Consider the below state space diagram. Assuming 'P' is the goal state , give the trace of the execution of the best first search on this graph. Show all intermediate steps.  	*2*	*2*	**10**
		b)	The joint probability distribution (p) for the traffic slowdown (S), accident (A) and construction (C) variables are as sown in the table. (t=true, f=false)	*2*	*2*	**10**

			<table><tr><th>S</th><th>C</th><th>A</th><th>p</th></tr><tr><td>t</td><td>t</td><td>t</td><td>0.01</td></tr><tr><td>t</td><td>t</td><td>f</td><td>0.03</td></tr><tr><td>t</td><td>f</td><td>t</td><td>0.16</td></tr><tr><td>t</td><td>f</td><td>f</td><td>0.12</td></tr><tr><td>f</td><td>t</td><td>t</td><td>0.01</td></tr><tr><td>f</td><td>t</td><td>f</td><td>0.05</td></tr><tr><td>f</td><td>f</td><td>t</td><td>0.01</td></tr><tr><td>f</td><td>f</td><td>f</td><td>0.61</td></tr></table> Find the following (i) $S \cap \overline{C} \cap A$ (ii) Probability of traffic slowdown (iii) Probability of construction with no slowdown (iv) $p(\overline{C} \cup S)$			
			OR			
	6	a)	What is recursion based search? What does it consist of? Write a pseudo code for depth search function using recursion.	*1*	-	**10**
		b)	Consider a family with two children. If we assume that: Each child is equally likely to be a boy or a girl and the gender of the second child is independent of the gender of the first child. Then find the probability of (i) No girls (ii) One girl, one boy (iii) Two girls (iv) Both children are girls conditional on the event "the older child is a girl". (v) Both children are girls conditional on the event "at least one of the children is a girl".	*2*	*2*	**10**
			UNIT - IV			
	7	a)	List the various probability models and describe the procedure of Monte Carlo simulation	*2*	*2*	**10**
		b)	With the help of a block diagram describe a hybrid AI for calculating the risk of running a clinical trial.	*2*	*2*	**10**
			OR			
	8	a)	Draw a block diagram representation of organization of an expert system and describe its components.	*1*	-	**10**
		b)	Describe rule based expert system with example statements	*2*	*2*	**10**
			UNIT - V			
	9	a)	What is genetic algorithm? What are the operators of genetic algorithm? Mention the steps involved in a genetic algorithm.	*2*	*2*	**10**
		b)	Define swarm intelligence? Consider a situation where a jar filled with 500 marbles is given to you and you have to come out with an estimation of number of marbles present in the jar without touching the jar or marbles. How do you apply swarm intelligence at this context? Explain in brief.	*2*	*2*	**10**

			OR			
	10	a)	Describe the following selection methods in genetic algorithm (i) Roulette wheel selection (ii) Stochastic universal sampling	*1*	-	**10**
		b)	What are the steps involved in ant colony optimization process. Explain in detail. Give algorithmic design and pseudo code.	*2*	*2*	**10**

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