

**Model Question Paper with effect for 2022 (CBCS Scheme)**

USN

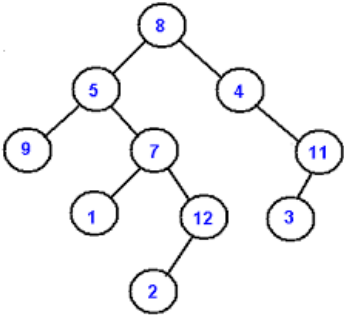
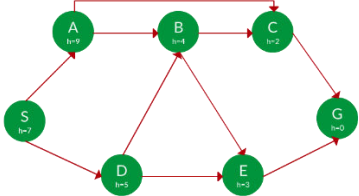
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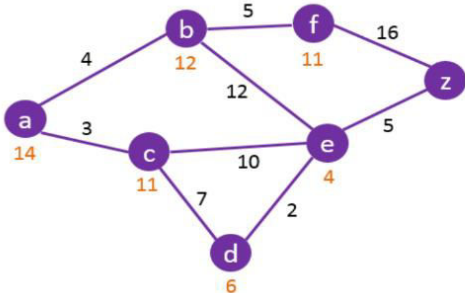
**Fourth Semester B.E. Degree Examination**  
**ARTIFICIAL INTELLIGENCE**

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	Define Total Turing test, logical positivism, tractable problems, decision theory, neurons	L1	5
	b	Explain the significant contributions of various branches in the foundations of AI	L2	10
	c	Give PEAS specification of biometric authentication system	L3	5
OR				
Q.02	a	Explain Milestones of AI with reference to (i) Neural networks failure to generalize (ii) Advent of DENDRAL (iii) Emergence of Intelligent Agents	L2	8
	b	Differentiate: (i)semi-dynamic vs dynamic (ii) episodic vs sequential (iii) deterministic vs stochastic	L2	7
	c	Give PEAS specification of Tomato classification system	L3	5
Module-2				
Q. 03	a	Define five components of a problem. Write a complete state space for a vacuum cleaner to clean 2 squares P and Q. Q is to the right of P	L3	10
	b	illustrate the separation property of GRAPH-SEARCH on a rectangular-grid problem. Write the 2 differences between Informed and Uninformed Search	L3	5
	c	Formulate an 8-queens problem with a correct and an incorrect solution Comment on protein design problem and role of AI in solving it.	L2	5
OR				
Q.04	a	For an automatic taxi driver application, explain Goal and utility agents with appropriate block diagrams	L2	8
	b	With an algorithm explain Uniform cost Search problem	L2	6
	c	 <p>Write the DFS with pruning for this graph with source node=8 and goal=3. Full steps to be written for full marks.</p>	L3	6
Module-3				
Q. 05	a	 <p>Apply the Greedy best first search to find the solution path from S to G. Write all steps as well as open and closed lists for full marks. <b>S(h=7),A(h=9),B(h=4),C(h=2),D(h=5), E(h=3),G(h=0)</b></p>	L3	8
	b	Outline a generic knowledge-based agents' program. Write PEAS specification for Wumpus world.	L2	8

	c	Explain Modus ponens and Theory of resolution with examples	L2	4
OR				
Q. 06	a	 <p>apply the A* search to find the solution path from a to z. Heuristics are with nodes, and cost is with edges. Write all steps as well as open and closed lists for full marks</p>	L3	8
	b	Explain contraposition, double implication elimination, demorgans rules with examples. Prove logically that there is no pit in [1,2]	L2	8
	c	Differentiate backward and forward chaining with examples	L2	4
<b>Module-4</b>				
Q. 07	a	Explain various ambiguities in Natural Language processing with examples and summarize in the form of a table about formal languages and their ontological and epistemological commitments	L2	10
	b	Define Universal and Existential Instantiation and give examples for both. Prove the following using <b>Backward and Forward chaining</b> : "As per the law, it is a crime for an American to sell weapons to hostile nations. Country E, an enemy of America, has some missiles, and all the missiles were sold to it by Solan, who is an American citizen." Prove that "Solan s criminal."	L3	10
OR				
Q. 08	a	Explain (i) Unification and (ii) Subsumption Lattice with examples. Write short notes on how First Order Logic can be applied to Wumpus World	L2	10
	b	write appropriate quantifiers for the following (i) Some students read well (ii) Some students like some books (iii) Some students like all books (iv) All students like some books (v) All students like no books Explain the concept of Resolution in First Order Logic with appropriate procedure.	L3	10
<b>Module-5</b>				
Q. 09	a	Explain various reasons for failure of First Order Logic Define a sample space for picking 2 tokens from 6 tokens of lab questions with token taken first time is not replaced.	L2	7
	b	Prove all Kolomogorovs axioms (Probability axioms).	L2	7
	c	Given that bus arriving late=0.3 and a student oversleeping probability is 0.4., find the probability that student gets late.	L3	6
OR				
Q. 10	a	Explain marginalization and normalization with a full joint distribution of (toothache, catch, cavity)	L2	8
	b	write the representation of Bayes Theorem. In a class, 70% children were fall sick due to Viral fever and 30% due to Bacterial fever. The probability of observing temperature for Viral is 0.78 and for Bacterial is 0.31. If a child develops high temperature, find the child's probability of having viral infection.	L3	8
	c	Explain the role of probability in solving problems of Wumpus world	L2	4

\*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.