U.S.N.										

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

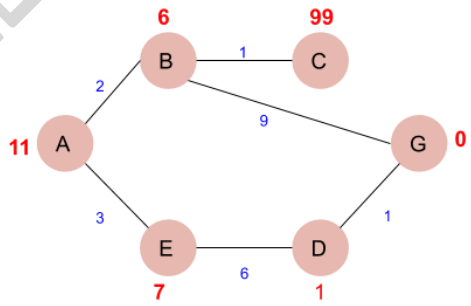
Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: 4**
Branch: AIML **Duration: 3 hrs.**
Course Code: 22AM4PCIAI **Max Marks: 100**
Course: Introduction to 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.

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.

			UNIT - I	*CO*	*PO*	Marks
1	a)		"Agents interact with environments through sensors and actuators". Justify this statement. Tabulate the simple agent function for vacuum-cleaner world.	*1*	*2*	**5**
	b)		Illustrate Uniform Cost Search algorithm and compare it with respect to Breadth First Search algorithm in terms of working, completeness, optimality, time complexity and space complexity.	*1*	*1*	**8**
	c)		Summarize the structure of Utility based agent program and Goal-based agent program.	*1*	*1*	**7**
			UNIT - II			
2	a)		Discuss Steepest Ascent Hill Climbing with its advantages and disadvantages.	*1*	*1*	**6**
	b)		Apply A* algorithm on the following graph and obtain the optimal path from starting node A to goal node G.  	*1*	*2*	**8**
	c)		Interpret the concept of Problem Reduction with suitable example.	*1*	*1*	**6**
			OR			
3	a)		Solve the following Cryptarithmetic Problem with Constraint Satisfaction. Problem: DONALD + GERALD = ROBERT. Initial State: (i) No two letters have the same value (ii) The sums of the digits must be shown in the problem.	*1*	*2*	**10**

		b)	Write the algorithm for Means-Ends Analysis. Considering a simple household robot, show the progress of this method to reach the goal.	***1***	***2***	**10**
			UNIT - III			
	4	a)	Prove p ↔ q and (p ∧ q) ∨ (~p ∧ ~q) are logically equivalent.	***2***	***2***	**6**
		b)	Convert the following First order logic statements to English sentences. i. ∀x student(x) → likes(x, Educative) ii. ∃x: people(x) ∧ likes Football(x) iii. ¬∀(x) [student(x) → like (x, Mathematics) ∧ like(x, Science)] iv. ∃xy ∀x ∀y((x< 0) ∧ (y< 0) → (xy = 8))	***2***	***2***	**6**
		c)	Convert the following sentences to Conjunctive Normal Form. i. (A→B) →C ii. A→(B→C) iii. (P→(Q→R)) →(P→(R→Q)) iv. (P→Q) →((Q→R) →(P→R))	***2***	***2***	**8**
			OR			
	5	a)	Differentiate Procedural and Declarative Knowledge.	***2***	***1***	**5**
		b)	Explain the following with suitable example. i. Semantic Network ii. Ontology	***2***	***1***	**10**
		c)	Illustrate the forward chaining algorithm with suitable example.	***2***	***1***	**5**
			UNIT - IV			
	6	a)	Interpret the concept of uncertainty by considering an example of Dental Diagnosis.	***2***	***1***	**6**
		b)	Differentiate Exact and Appropriate Inference in Bayesian network.	***2***	***1***	**8**
		c)	Explicate how Dempster-Shafter theory is formulated to effectively differentiate between uncertainty and ignorance.	***2***	***2***	**6**
			UNIT - V			
	7	a)	List the characteristics and the need of an expert system.	***3***	***1***	**8**
		b)	Differentiate between Conventional system and Expert system.	***3***	***1***	**8**
		c)	Provide the applications of EMCIN expert system.	***3***	***1***	**4**

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