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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

V Semester B. E. Examinations Jan/Feb-21

Computer Science and Engineering

ARTIFICIAL INTELLIGENCE (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

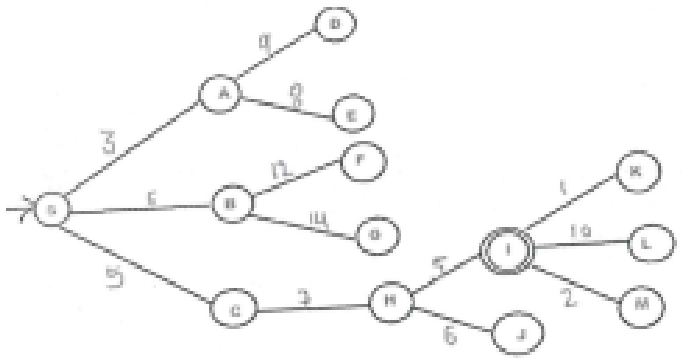
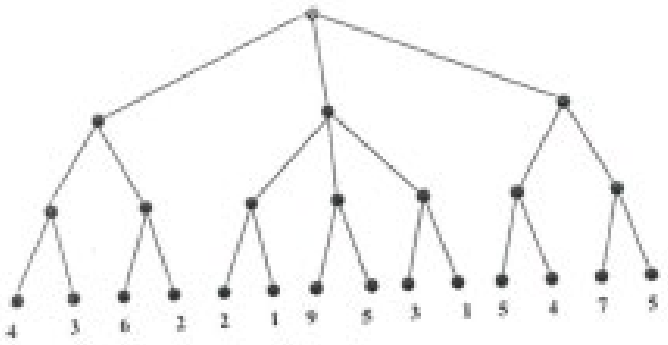
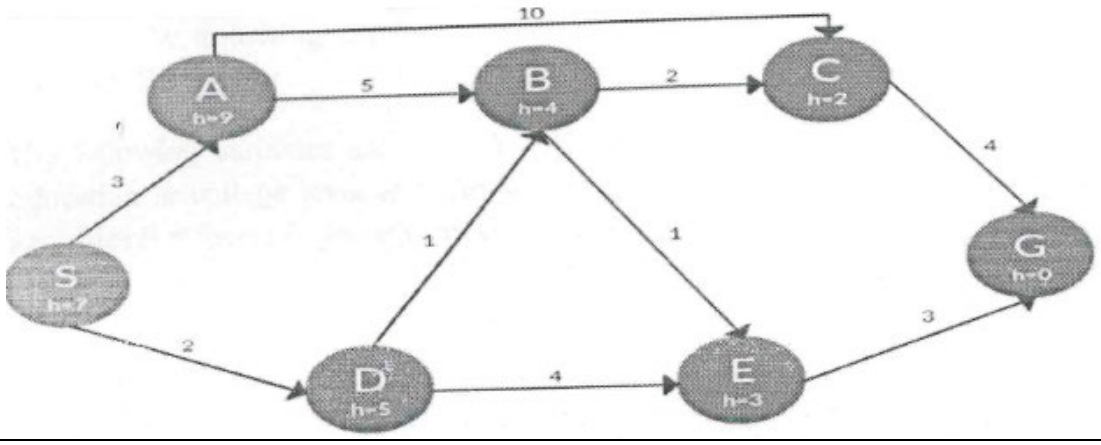
1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6.

PART-A

1	1.1	List any two applications of Artificial Intelligence with respect to expert tasks.	02
	1.2	Differentiate between static and dynamic environment.	02
	1.3	Automated vehicle is an example of _____ learning.	01
	1.4	Differentiate between simple hill climbing and Steepest-Ascent Hill climbing.	02
	1.5	Define Unification algorithm.	02
	1.6	Inductive learning involves finding a hypothesis.	01
	1.7	Uniform cost search expands the node n using the _____.	01
	1.8	List the two requirements for a good control strategy in problem solving.	02
	1.9	The teacher returns reward and punishment to learner is an example of _____.	01
	1.10	Convert the following sentences to First Order logic: a. Jhon likes fruits b. Kumquats are fruit. c. People eat what they like. Does Jhon eat Kumquats?	02
	1.11	Draw state space diagram of hill climbing algorithm.	02
	1.12	Agents behavior can be best described by _____.	01
	1.13	Categorize the following problems into ignorable, recoverable or irrecoverable problems : a. Water jug b. 8-puzzle c. Chess d. Theorem proving	01

PART-B

2	a	Discuss the structure of simple reflex agent and model based reflex agent with neat diagrams.	08

	b	Apply DFS and BFS search strategies on water jug problem stated below: A water jug problem: you are given two jugs, a 4 gallon one and 3 gallon one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallon jug into the 4 gallon jug?	08
3	a	Apply best first search technique for the below graph where source is S and Goal state is I. 	08
	b	Apply alpha-beta pruning method for the following game tree and find the value at the root also mention the nodes which are pruned.  **OR**	08
4	a	Apply A* algorithm for the following graph to find the best path from S to G. 	08

	b	Trace the constraint satisfaction procedure for solving the following cryptarithmetic problem: CROSS +ROADS ---------- DANGER	08
5	a	Consider the following sentences 1. Marcus was a man 2. Marcus was a Pompeian 3. All pompeians were Romans 4. Caesar was a ruler 5. All Romans were either loyal to Caesar or hated him. 6. Everyone is loyal to someone. 7. People try to assassinate rules they aren't loyal to. 8. Marcus tried to assassinate Caesar a. Translate these sentences into predicate logic. b. Convert the formulas of part A into clause form. c. Use Resolution method to answer the question "Marcus hates Caesar".	12
	b	Explain knowledge based agent algorithm.	04
		OR	
6	a	Consider the following which involves an investment decision about whether to invest IBM stock. The following variables are used : A=Have $10,000 B=Younger than 30 C=Education at College level D=Annual Income of atleast $40,000 E=Invest in securities F=Invest in growth stocks, G=Invest in IBM stock (the potential goal) Each of these variables can be answered as true (yes) or false (no). The facts: We assume that an investor has $10,000 (i.e. that A is true) and that she is 25 year ole (i.e. that B is true). Should would like advice on investing in IBM stock (yes or no for the goal)lm The rules: Our knowledge base includes these five rules : R1: IF a person has $10,000 to invest and she as college degree, THEN she should invest in securities. R2: IF a person's annual income is atleast A$40,000 and she has a college degree, THEN she should invest in growth stocks. R3: IF a person is younger than 30 and she is investing in securities, THEN she should invest in growth stocks. R4: IF a person is younger than 30 and older than 22, THEN she a college degree. R5: IF a person wants to invest in a growth stock, THEN the stock should be IBM. Using backward chaining method determine whether to invest in IBM.	08

	b	Discuss agents based on prepositional logic with necessary algorithm.	08
7	a	Illustrate Decision trees learning algorithm with an example.	08
	b	Explain inductive learning algorithm.	08
8	a	On an airport all passengers are checked carefully. Let T with $t \epsilon \{0,1\}$ be the random variable indicating whether somebody is a terrorist (t=1) or not (t=0) and A with $a \epsilon \{0,1\}$ be the variable indicating arrest. A terrorist shall be arrested with probability P(A=1|T=1) =0.98 , a non –terrorists with probability P(A=1|T=0)=0.001. One n hundred thousand passengers is a terrorist, (P(T=1) =0.00001. Find the probability that an arrested person actually is a terrorist.	08
	b	Discuss the semantics of belief networks with an example.	08