Reg. No. | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

Fourth Semester

AD18402 – PRINCIPLES OF ARTIFICIAL INTELLIGENCE

(Artificial Intelligence and Data Science)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Use appropriate search algorithms for any AI problem.	3
CO 2	Make Inferencing in game playing.	3
CO 3	Represent a problem using predicate logic.	3
CO 4	Solve hard problems using problem-solving strategies with knowledge representation mechanism.	3
CO 5	Design and develop expert system for real-time applications.	4

PART- A (10 x 2 = 20 Marks)

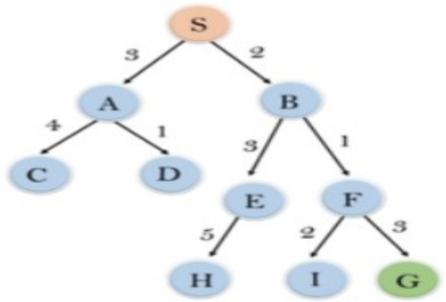
(Answer all Questions)

		CO	RBT LEVEL
1.	What is meant by Artificial Intelligence in terms of rational thinking?	1	1
2.	Differentiate Blind Search and Heuristic Search.	1	2
3.	Define an inference procedure.	2	1
4.	Distinguish between most constraint variable and least constraint variable.	2	2
5.	What is Skolem constant?	3	1
6.	What do you mean by resolution and unification in AI?	3	1
7.	What does planning involve?	4	1
8.	What is Sussman's anomaly?	4	1
9.	What are the Characteristics of Expert Systems?	5	1
10.	Define Knowledge Elicitation.	5	1

PART- B (5 x 14 = 70 Marks)

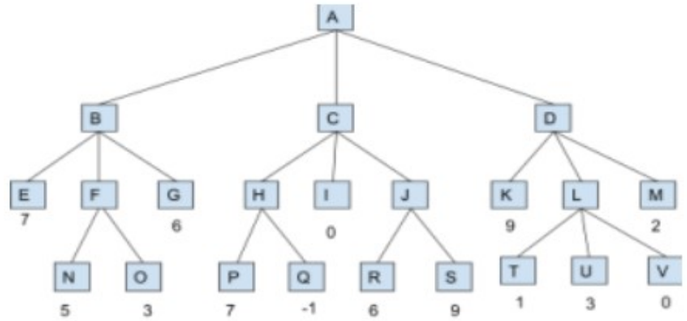
			Marks	CO	RBT LEVEL
11. (a)	(i)	Illustrate the characteristics of production systems.	(7)	1	3
	(ii)	Explain about the admissibility of A* algorithm.	(7)	1	3
		(OR)			

	(b)	Discuss how best first search combines the advantages of Depth First Search and Breadth First Search. Present the A* algorithm and trace it to find the most cost-effective path to reach from start state S to final state G by considering the following graph-	(14)	1	3



node	H (n)
A	12
B	4
C	7
D	3
E	8
F	2
H	4
I	9
S	13
G	0

12. (a)	(i)	Explain Min-Max algorithm and Find the optimal move to be taken at the maximizing node A.	(10)	2	3



	(ii)	Is MinMax procedure a depth first search or breadth first search?	(04)	2	3
		(OR)			
(b)	(i)	Write the algorithm for Constraint Satisfaction Problems and solve the below using it. Consider the arithmetic problem represented in letters as shown below. Assign decimal digits to each of the letters in such a way that the answer to the problem is correct. If the same letter occurs more than once, it must be assigned the same digit each time. No two letters may be assigned the same digit.	(10)	2	3

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  T W O
+ T W O
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F O U R
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	(ii)	Explain Means-Ends Analysis with an example.	(04)	2	3
13. (a)		Explain Backward and Forward Chaining, with example in logic representation. Also mention advantages and disadvantages of both the algorithms.	(14)	3	3
		(OR)			

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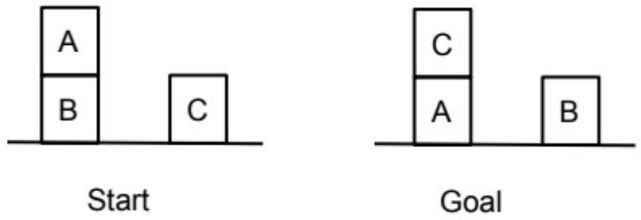
				Marks	CO	RBT LEVEL
(b)	How is resolution in first order predicate logic different from that of propositional performed? What is unification algorithm and why is it required?			**(14)**	**3**	**3**
14. (a)	Consider the following blocks world problem			**(14)**	**4**	**3**
						
	Design a plan using Goal Stack planning (STRIPS).					
	(OR)					
(b)	Solve Sussman Anamoly Problem by applying Non-linear Planning using Constraint Posting.			**(14)**	**4**	**3**
15. (a)	**(i)**	Explain with a neat diagram, the architecture of an expert system		**(10)**	**5**	**3**
	(ii)	Explain in detail meta knowledge and how meta knowledge is represented in rule based expert systems?		**(4)**	**5**	**3**
	(OR)					
(b)	Explain in detail about DART, XCON expert system			**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)
(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Solve the given problem. Describe the operators involved in it. Consider a Water Jug Problem: You are given two jugs, a 4-gallon one and a 3-gallon one. Neither have any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug? Explicit Assumptions: A jug can be filled from the pump, water can be poured out of a jug onto the ground, water can be poured from one jug to another and that there are no other measuring devices available.	**(10)**	**1**	**5**

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