Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R, S) / S7 (PT) (R) Examination December 2023 (2019 Scheme)

Course Code: CST401

Course Name: ARTIFICIAL INTELLIGENCE

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Define PEAS representation. Give the PEAS representation of a self-driving car.	(3)
2		Distinguish between episodic and sequential environment.	(3)
3		Describe the state space representation of 8-queens problem.	(3)
4		Discuss the infrastructure needed to solve a search problem.	(3)
5		Explain the properties of min-max algorithm.	(3)
6		Define Constraint Satisfaction Problem with an example.	(3)
7		Explain Modus Ponens and Modus Tollens with an example.	(3)
8		Discuss the drawbacks of propositional logic.	(3)
9		Explain cross validation in machine learning.	(3)
10		Distinguish between supervised and unsupervised learning.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

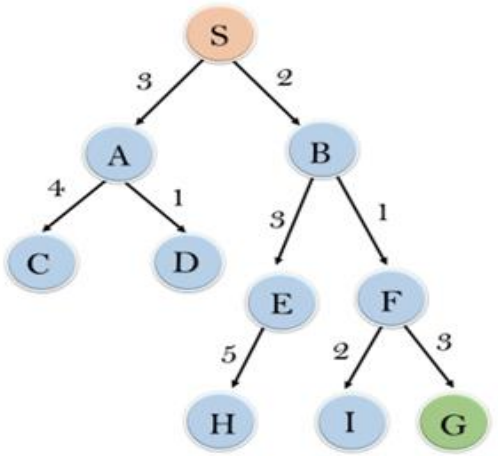
11	a)	Explain learning agent with a neat diagram.	(8)
	b)	Discuss the milestones in the history of Artificial Intelligence.	(6)

OR

12	a)	Explain the structure of a model based reflex agent with a neat diagram.	(8)
	b)	Describe the aspects of AI based on human centred approach.	(6)

Module II

13		Explain Best First Search algorithm. Perform BFS search in the problem given below to reach goal node G from source node S.	(14)



The heuristic values of A, B, C, D, E, F, G, H, I, S, G are 12, 4, 7, 3, 8, 2, 4, 9, 13, and 0 respectively.

OR

14 a) Explain the working of Depth Limited Search with an example. (8)

b) Discuss the optimality of A* algorithm. (6)

Module III

15 Solve the following crypt arithmetic problem using MRV and forward checking. (14)

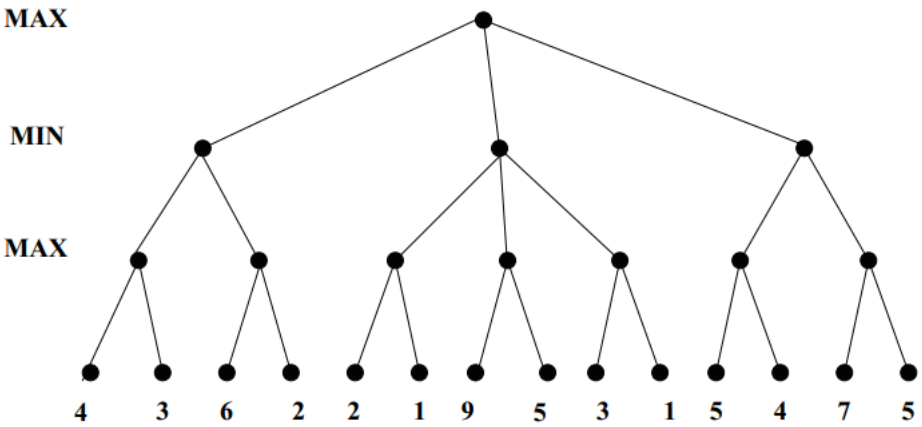
S E N D +

M O R E

M O N E Y

OR

16 Perform Alpha beta pruning in the two player game tree given below. (14)



Module IV

17 a) Explain the syntax and semantics of predicate logic. (10)

b) Define entailment with an example. (4)

OR

18 a) Consider the following facts in a knowledge base (8)

1. Gita likes all kinds of food.
2. Mango and chapati are food.
3. Gita eats almond and is still alive.
4. Anything eaten by anyone and is still alive is food.

Prove "Gita likes Almond" using resolution technique.

b) Distinguish between forward chaining and backward chaining. (6)

Module V

19 Explain linear regression. Use the following data to construct a linear regression model for the auto insurance premium as a function of driving experience. (14)

Driving experience (in years)	**5**	**2**	**12**	**9**	**15**	**6**	**25**	**16**
Auto insurance premium ($)	**64**	**87**	**50**	**71**	**44**	**56**	**42**	**60**

OR

20 Explain the working of a decision tree. Use ID3 algorithm and find the best attribute to split at the root level of a decision tree. (14)

Age	Competition	Type	Class (profit)
Old	Yes	Software	Down
Old	No	Software	Down
Old	No	Hardware	Down
Mid	Yes	Software	Down
Mid	Yes	Hardware	Down
Mid	No	Hardware	Up
Mid	No	Software	Up
New	Yes	Software	Up
New	No	Hardware	Up
New	No	Software	Up

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