Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (R,S) Examination November 2025 (2019 Scheme)

Course Code: AIT307
Course Name: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Max. Marks: 100 Duration: 3 Hours

PART A
(Answer all questions; each question carries 3 marks)

		Marks
1	What is Turing test approach.	3
2	Explain the structure of an agent.	3
3	How the 8 Puzzle formulated as a toy problem?	3
4	State any three real world problems of AI.	3
5	State the different types of constraints.	3
6	State global constraints with an algorithm.	3
7	How first order logic differs from propositional logic?	3
8	Differentiate between forward chaining and backward chaining.	3
9	Explain the different types of learning.	3
10	Define overfitting.	3

PART B
(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Sketch and explain the structure of Learning agent.	9
	b)	Write a brief description about the structure of Utility based agent.	5
12	a)	Explain the properties of task environment.	9
	b)	List any five applications of Artificial Intelligence.	5

Module -2

13	a)	Define Depth first search with the search evaluation strategies. Create a graph with the following nodes and search for GOAL node G. A: [B, C], B: [D, E], C: [F, G], D: [H], E: [I, J], F: [K], G: []	6
	b)	What are the components of a well-defined AI problem? Explain each component based on 16 puzzle problem.	8

14 a) State the advantage and disadvantage of A* algorithm and how it uses the heuristic function with an example. Also explain its evaluation strategies such as completeness, optimality, space and time complexities. 14

Module -3

15 a) Compare the Min-max algorithm and alpha–beta pruning with an example. 14

16 a) Explain the complexity of Arc consistency algorithm with an example. 8

b) Explain the term Hyperarc consistency, Path consistency and K-Path consistency. 6

Module -4

17 a) Consider the following sentences: 14

1. John likes all kinds of food.
2. Apples are food.
3. Chicken is food.
4. Anything anyone eats and isn't killed by is food.
5. Bill eats peanuts and is still alive.
6. Sue eats everything Bill eats.

Give a resolution proof to answer the question "John likes peanuts".

18 a) Find the MGU of (Brother (Tom, x), Bother (Tom, John)). 6

b) What is knowledge base agent? How does it work? Write an algorithm for knowledge base agent. 8

Module -5

19 a) What do you mean by Linear classification with logistic regression? 8

b) What is entropy? What is its significance in the decision tree. 6

20 a) Explain decision tree learning algorithm. 14

Consider the following data set comprised of three binary input attributes (A1, A2, and A3) and one binary output.

Example	A_1	A_2	A_3	Output y
x_1	1	0	0	0
x_2	1	0	1	0
x_3	0	1	0	0
x_4	1	1	1	1
x_5	1	1	0	1

Use the DECISION-TREE-LEARNING algorithm to learn a decision tree for these data. Show the computations made to determine the attribute to split at each node.

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