# 1100AIT307112403

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Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSIT

B.Tech Degree S5 (S,FE) Examination May 2025 (2019 Scheme)

# Course Code: AIT307 Course Name: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Max. Marks: 100

Duration: 3 Hours

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		PART A (Answer all questions; each question carries 3 marks)	Marks
1		Define the term agent. Explain with an example.	3
2		Define PEAS and explain with an example.	3
3		State the searching process with an example.	3
4		Differentiate between Breadth First Search and Best First Search.	3
5		State the components of a CSP problem	3
6		Define path consistency with an example	3
7		Define the term Logic and Entailment	3
8		Convert the following statements into propositional logic	3
		• If it is raining, then the ground will be wet.	
		Hari is hardworking and intelligent	
9		Explain about supervised learning	3
10		Explain about reinforcement learning	3
		PART B (Answer one full question from each module, each question carries 14 marks)	
		Module -1	
11	a)	For the following activities, give a PEAS description of the task environment and	
		characterize it in terms of the task environment properties.	
		<ul><li>i) Robot Vacuum Cleaner</li><li>ii) Driverless cars</li></ul>	9
	b)	List any five applications of AI.	5
12	a)	Differentiate between Utility based agent and Goal based agent.	8
	b)	Explainthe properties of task environment.	6
		Module -2	
13	a)	Explain Uniform cost search with the search evaluation strategies such as	7
		completeness, optimality, space and time complexities.	

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- b) Compare Depth first search and iterative deepening search strategy with example. 7
- 14 a) State the advantage and disadvantage of A\* algorithm and how it uses the heuristic 14 function with an example. Also explain its evaluation strategies such as completeness, optimality, space and time complexities.

# Module -3

- a) Solve the following crypt arithmetic problem by hand, using the strategy of 10 backtracking with forward checking and the MRV (Minimum Remaining Value) & least-constraining-value heuristics. TWO+TWO=FOUR
  - b) What is node consistency how it is differ from Arc consistency.
- 16 a) Explain backtracking search in CSP with an example of 4 queens problem.
  - b) Illustrate the working of Alpha-beta pruning.

# Module -4

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- 17 a) State the architecture of knowledge base agent and functions used in the agent.
  - b) Explain unification algorithm with an example.
- 18 a) Convert the following sentences into FOL.
  - If someone studies, they pass the exam.
  - There exists a student who takes both Math and Physics.
  - Everyone has at least one friend.
  - A student who studies hard passes the exam.
  - There is a cat that is black.
  - All passengers on a flight must have a ticket.
  - A mother is a female parent.

# Module -5

19	a)	Give the significance of learning from example. Explain various type of learning	8	
		in problem solving.		
	b)	Explain about underfitting and overfitting.	6	
20	a)	Explain Decision Tree with example.	4	

b) Consider the following data set comprised of three binary input attributes (A1, 10 A2, and A3) and one binary output.

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Example	$ A_1 $	$ A_2 $	$A_3$	Output y
XI	1	0	0	0
<b>X</b> 2	1	0	1	0
<b>X</b> 3	0	1	0	0
<b>X</b> 4	1	1	1	1
<b>X</b> 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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