

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S5 (S,FE) Examinations June 2026 (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 List out the disciplines that contributed to AI. 3
- 2 How are the definitions of Artificial Intelligence organized into three categories? 3
- 3 Mention the conditions that made A* algorithm the optimal one. 3
- 4 What are the different methods used to represent states and the transitions between components in agent programs? 3
- 5 Explain the term Constraint Satisfaction Problem in terms of Graph Colouring Problem 3
- 6 Give definitions for local and global heuristics. 3
- 7 What are the different types of quantifiers? Give examples for same 3
- 8 Write a note on forward chaining with an example. 3
- 9 State Occam's razor principle. Illustrate its necessity in learning hypothesis. 3
- 10 Define hypothesis h_i and Version Space v_i for the following values: 3

X	15	12	6	3	8	2	9	11	20
CLASS LABEL	1	1	0	0	0	0	0	1	1

PART B

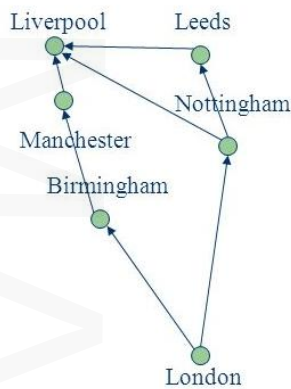
(Answer one full question from each module, each question carries 14 marks)

Module -1

- 11 a) Give the PEAS description for the following. Also explain the task environment and their characteristics.
 - i) Robot Vacuum Cleaner. 5
 - ii) Soccer Game 5
- b) With diagrammatic representation explain Model based reflex agent program. 4
- 12 a) Write a note on
 - i) Utility based agent programs. 5
 - ii) Goal based agent programs 5
- b) Explain the structure of Agent Program with diagrammatic representations 4

Module -2

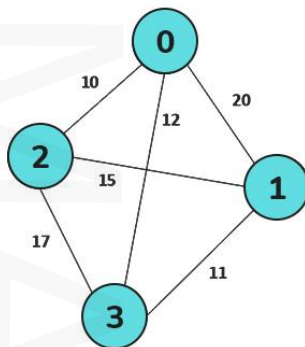
- 13 a) Elucidate the steps performed by a problem solving agent by explaining the following Route finding problem using DFS algorithm



6

Given Source- London and Destination-Liverpool.

- b) Choose the appropriate search technique among BFS, DFS, A* for the following . Also mention the reason:
- GPS Navigation System.
 - Network routing
- 14 a) Explain the following Travelling salesman problem using Greedy BFS algorithm.



State	h(n)
0	0
1	3
2	5
3	4

6

- b) Generate algorithm for the following uninformed search strategies
- Breadth First Search
 - Depth Limited Search

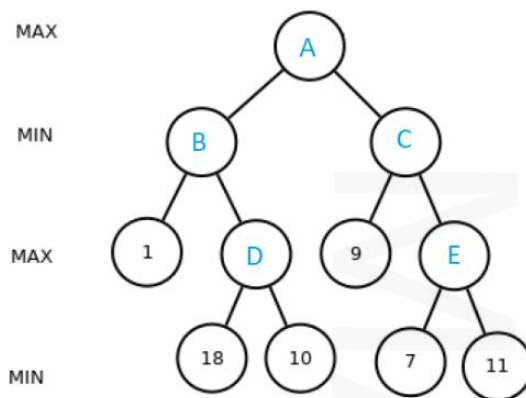
4

4

Module -3

- 15 a) Outline the algorithm for Minimax search procedure and solve the following example. For the same tree prune the nodes that accepts the condition $\alpha \geq \beta$.

8



- b) Solve the following crypt arithmetic problem and identify the digits corresponding to each letter in each of the given problem

i)

$$\begin{array}{r} \text{YOUR} \\ + \text{YOU} \\ \hline \text{HEART} \end{array}$$

ii)

$$\begin{array}{r} \text{BASE} \\ + \text{BALL} \\ \hline \text{GAMES} \end{array}$$

3

3

- 16 a) Elucidate Local Search algorithm in CSP and perform backtracking search for the queens Q1, Q2, Q3, Q4 arranged on a 4x4 square board.

8

- b) Briefly explain the inference techniques

i) Arc Consistency

3

ii) Forward Checking

3

Module -4

- 17 a) Consider a 4x4 cave with a Wumpus, a treasure, a player.
- Give the diagrammatic representation of the cave environment. 2
 - List the PEAS description for Wumps World. 2
 - Also explain the task environment and characteristics of Wumpus World 2
 - Derive the axiom on how the Wumpus world is designed. 2
- b) Generate First Order Predicate Logic for
- Every man respects his parent 2
 - Not all students like both Mathematics and Science 2
 - Only one student failed in Mathematics 2
- 18 a) Convert the following sentences into FOL.
- Susan eats everything Bill eats. 2
 - For everyone there is someone to love 2
 - Everyone is loyal to someone 2
 - Some employees are on leave today 2
- b) i) Define backward chaining 2

- ii) Differentiate between forward and backward chaining 2
- iii) Give examples backward chaining 2

Module -5

- 19 a) Identify the first splitting attribute for decision tree by using ID3 algorithm with the following dataset 8

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

- b) Is regression a supervised learning technique? Justify your answer. Compare regression with classification with examples. 6
- 20 a) Explain (a) Hypothesis space (b) Version space (c) Most General hypothesis (d) Most specific hypothesis in the context of a classification problem. 8
- b) With proper examples distinguish between overfitting and underfitting. How can it affect model generalization? 6
