



VIT-AP
UNIVERSITY

Continuous Assessment Test – Fall semester (2025-26) -August 2025

Course Code: CSE3002

Maximum Marks: 50

Duration: 90 Mins

Set No: 7

Course Title: Artificial Intelligence

Date: 18/08/2025

Exam Type : Closed Book

School: SCOPE

Slot: A2

Session: AN

Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice

General Instructions if any Open Book/Open Notebook/Closed Book:

1. "fx series- non Programmable calculator are permitted : NO
2. Reference tables permitted : NO

PART – A: Answer any ALL Questions, Each Question Carries 10 Marks (5×10=50 Marks)

1. Define artificial intelligence and explain the concept of intelligence in the context of AI. highlighting key milestones, and describe three real-world applications of AI. (10M)
2. Consider two jugs with capacities 7 liters and 5 liters respectively. The initial state is (0, 0) (both jugs empty), and the goal is to exactly fill 4 liters in 7 liters water jug (4, 0). Show **step-by-step state transitions** from the initial state to the goal state, using production rules. Following operations are allowed:
 - Fill a jug completely.
 - Empty a jug completely.
 - Pour water from one jug to the other until one is empty or the other is full. (10M)
3. You are solving an 8-Puzzle on a 3×3 board. You can move the blank tile Up (U), Down (D), Left (L), or Right (R). The **Start** and **Goal** states are given.
We will use the **misplaced tiles heuristic (h_1) using Manhattan distance measure as follows:**

- For each tile, add 1 if it is not in its correct position in the goal state.
- Add 0 if it is in the correct position.

For instance, tile number 2 (i.e 2) in the Start state is in its position so count 0, while tile number 4 (i.e 8) is not in its goal position so counts 1. The heuristic value of the Start State is: $h_1(\text{Start}) = 0 + 0 + 1 + 1 + 1 + 0 + 1 + 1 = 5$. Fill in heuristic $h_1(n)$ values below (n = current node). The first is done for you. In which state does the search terminate in the given problem? (10M)

Start state:

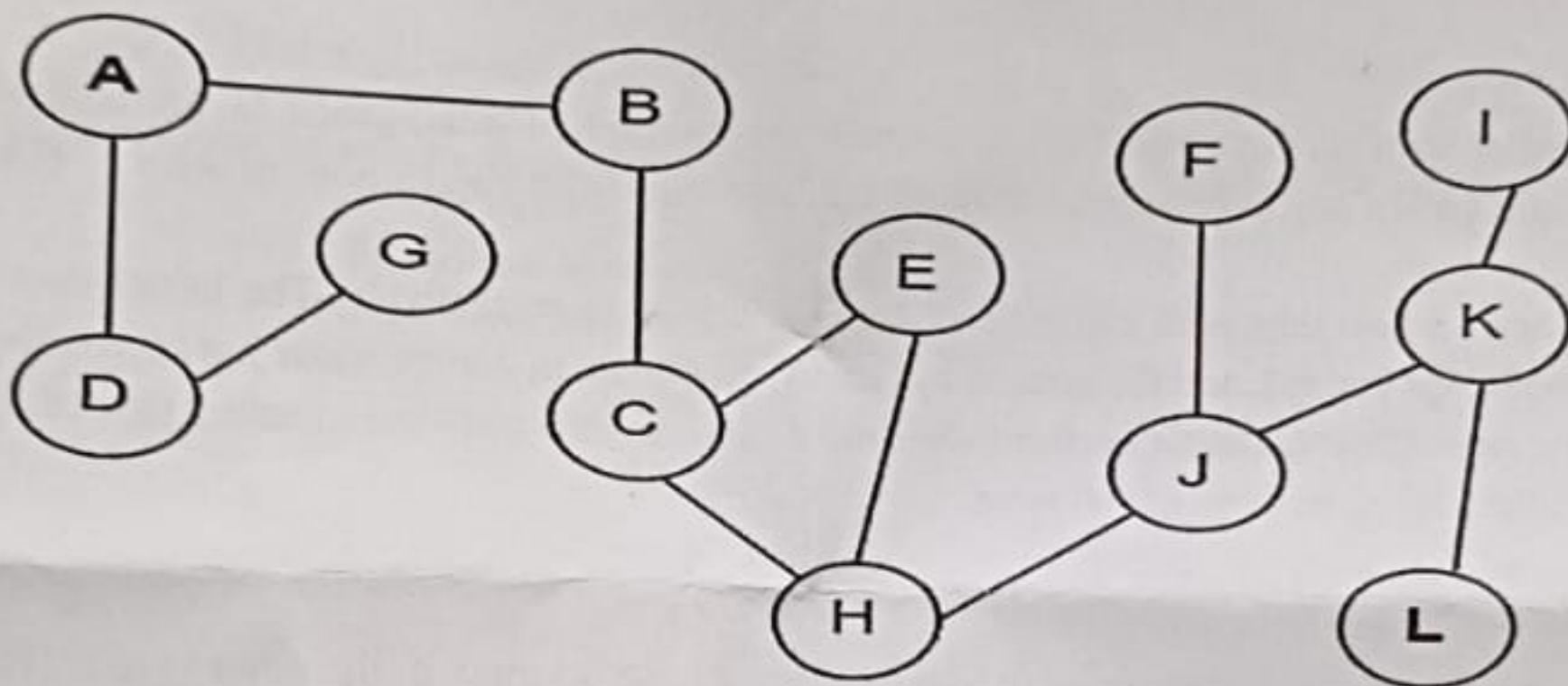
	2	3
8	4	1
7	6	5

$h_1(a) = 5$

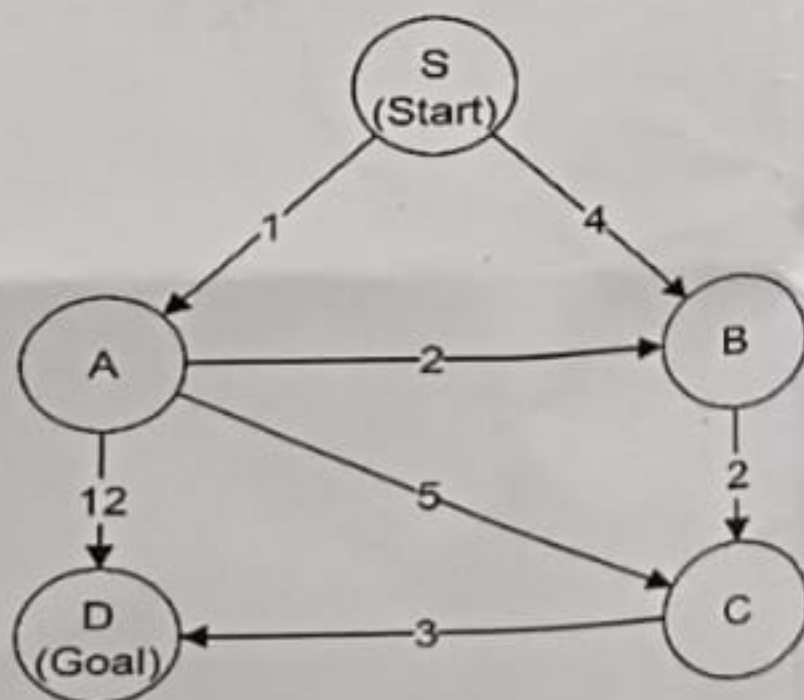
Goal state:

1	2	3
4	5	6
7	8	

4. Consider the following graph, find the traversal order to reach the solution node **L** from starting node **A**. Solve the problem using both DFS and BFS. (10M)



5. Using the given graph and heuristic values, apply the A* search algorithm to find the optimal path and its cost from the start node **S** to the goal node **D**. Find $F(n) = g(n) + h(n)$ values for each node. (10M)



Heuristic Value

S = 7
A = 6
B = 2
C = 1
D = 0