CSE_4053- Artificial Intelligence
Assignment
PE-II, 6th Semester CSE **Max Marks: 10**
Deadline: 02.04.2025

Question#	Question	Marks	CO#	BL#
1.	Outline the important milestones for the evolution time line of artificial intelligence. What are the latest introductions into the domain of AI?	2	1	L2
2.	Your AI agent is provided with two water jugs of capacity 6L and 8L respectively. Design the steps for your agent so that it can successfully fill another jug with 4L of water. (*Adhere to the solution formatting strictly as per Hint#1 provided at the end of this table.*)	2	2	L4
3.	Given below are the initial and final states (left and right figures respectively) of an 8-puzzle problem. Find the path and path cost to obtain the solution for this. (g(n) = Depth of node and h(n) = Number of misplaced tiles.) 5 1 3 2 4 7 6 8 4 1 3 5 2 7 6 8	3	2	L3
4	Justify the need for conversion to clausal form in KR. Convert the following expression into clausal form along with detail steps. $\exists x \forall y \forall u(\exists V P(f(x), v) <=> Q(g(y, u) \& R(x, v)))$	3	4	L4

Hint#1 (Water jugs capacities 4 and 3 gallons respectively where agent needs to get 2 gallons exactly)
The operators to be used to solve the problem can be describes as shown below. They are represented as rules whose left side are matched against the current state and whose right side describes the new state that results from applying the rules.

We have two jugs a 4 gallon and a 3 gallon.

Consider the following **Rule set:**

1. (x,y)->(4,y) fill the 4 gallon jug

If x<4.

2. (x,y)->(x,3) fill the 3 gallon jug

If x<3

3. (x,y)->(x-d,y) pour some water out of the 4-gallon jug.

If x>0

4. (x,y)->(x-d,y) pour some water out of the 3-gallon jug.

If y>0

5. (x,y)->(0,y) empty the 4-gallon jug on the ground

If x>0

6. (x,y)->(x,0) empty the 3-gallon jug on the ground

If y>0

7. (x,y)->(4,y-(4-x)) pour water from the 3-gallon jug into the 4-gallon

If x+y>=4 and y>0 jug until the 4-gallon jug is full

8. (x,y)->(x-(3-y),3)) pour water from the 4-gallon jug into the 3-gallon

If x+y>=3 and x>0 jug until the 3-gallon jug is full.

9. (x,y)->(x+y,0) pour all the water from the 3-gallon jug into

If x+y<=4 and y>0 the 3-gallon jug.

10. (x,y)->(0,x+y) pour all the water from the 4-gallon jug into

If x+y<=3 and x>0 the 3-gallon jug.

11. (0,2)->(2,0) pour the 2-gallon from the 3-gallon jug into the 4-gallon jug.

12. (2,y)->(0,x) empty the 2 gallon in the 4 gallon on the ground.

Production of the water jug problem:

Gallons in the 4-gallon jug	Gallons in the 3-gallon	Rule Applied
0	0	
0	3	2
3	0	9
3	3	2
4	2	7
0	2	5 or 12
2	0	9 or 11

One solution to the water jug problem.