Name: Enrolment No:	

UPES
End Semester Examination, December 2023

Course: Introduction to Artificial Intelligence — **Semester : 3**
Program: BCA — **Time : 03 hrs.**
Course Code: CSAI2010P — **Max. Marks : 100**

Instructions: Attempt all questions. Last question of Section B and C has an internal choice.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	How does Artificial Intelligence is related to Machine learning and Deep learning? Explain it by giving the block diagram related to these three concepts.	4	CO1
Q 2	As an AI expert what Search algorithm criteria would be apply for its evaluation? Discuss by taking a suitable example of it.	4	CO1
Q 3	What are the Limitations of propositional logic?	4	CO2
Q 4	Discuss various Elements of first-order logic.	4	CO2
Q 5	Check the validity of the following: $P \rightarrow (Q \rightarrow R)$ equivalent to $(P \rightarrow Q) \rightarrow (P \rightarrow R)$	4	CO3

SECTION B
(4Qx10M= 40 Marks)

Q 6	Your roommate comes home; he/she is completely wet. You know the following things: – Your roommate is wet – If your roommate is wet, it is because of rain, sprinklers, or both – If your roommate is wet because of sprinklers, the sprinklers must be on – If your roommate is wet because of rain, your roommate must not be carrying the umbrella – The umbrella is not in the umbrella holder – If the umbrella is not in the umbrella holder, either you must be carrying the umbrella, or your roommate must be carrying the umbrella – You are not carrying the umbrella	10	CO3

	Can you conclude that the sprinklers are on? Can AI conclude that the sprinklers are on?		
Q 7	**Translate each of the following sentences into First Order Logic (FOL):** **(a) Every number is either negative or has a square root** **(b) Some numbers are not real** **(c) Every connected and circuit-free graph is a tree** **(d) Not every graph is connected**	**10**	**CO2**
Q 8	**Discuss AI Search Algorithms Classification. As an AI expert what Search algorithm criteria would be apply for its evaluation?**	**10**	**CO1**
Q 9	**Prove that $[(P \rightarrow Q) \vee (R \rightarrow S)] \rightarrow [(P \vee R) \rightarrow (Q \vee S)]$ is a contingency.** **OR** **Translate the following English sentences to Propositional Logic.** **Propositions: (R)aining, Liron is (S)ick, Liron is (H)ungry, Liron is (HA)appy, Liron owns a (C)at, Liron owns a (D)og** **(a) It is raining if and only if Liron is sick** **(b) If Liron is sick then it is raining, and vice versa** **(c) It is raining is equivalent to Liron is sick** **(d) Liron is hungry but happy**	**10**	**CO2**
SECTION-C (2Qx20M=40 Marks)			
Q 10	**Discuss the design issues of an Artificial Neural Network. Discuss application areas of an Artificial Neural Network. What is back propagation in Artificial Neural Network?**	**20**	**CO3**
Q 11	**Take your own example for contrasting informed (BFS & DFS) and un-informed search (Greedy and A*) strategies of AI in terms of Time, Space complexities, completeness, and optimality. Give a concluding remark about which one would you prefer and why.** **OR** **Draw the State space diagram State-Space and state-space traversal using depth-first search and breath-first search:**	**20**	**CO4**

Exercise activity / machine	Coverage of different parts of the body	Time taken to burn 300 Cal (Minutes)	Recovery time after burning 300 Cal (Minutes)
0. Warmup activities	Full body	10	5
1. Skipping rope	Upper + Lower body	15	16
2. Exercise bike	Lower body	25	10
3. Tread Mill		20	12
4. Step Mill		16	14
5. Dumbbell	Upper body	12	9
6. Barbell		10	10
7. Cable-Crossover		10	8
8. Pulling bars	Upper + Middle body	6	10
9. Incline bench	Middle body (abdomen)	20	8
10. Leg press machine		11	8
11. Climbing rope	Upper + Middle + Lower body	10	5
12. Hammer strength	Upper body	8	4
13. Stretching	Full body	-	0