

COURSE CODE (CREDITS): 24B11CI411 (3)

MAX. MARKS: 35

COURSE NAME: ARTIFICIAL INTELLIGENCE: RECENT TRENDS AND APPLICATIONS

COURSE INSTRUCTORS: AAYUSH SHARMA

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks															
Q1	A home-automation expert system uses rules: 1. R1: IF motion AND dark THEN light_ON. 2. R2: IF time > 22:00 AND motion THEN security_alert. Current facts: motion=TRUE, dark=TRUE, time=23:30. Tasks :- 1. Apply forward chaining; show each rule firing and resulting facts. 2. How would you prevent conflicting actions (light_ON vs. security_alert)?	[CO2]	[2X4]															
Q2	You model animals with a semantic net: Cat-IS_A-Mammal; Mammal-IS_A-Animal; Cat-HAS-Claws. Tasks :- 1. Draw this network and derive "Cat is an Animal." 2. Define a "Reptile" frame with slots: Skin_Type (default "scales"), Cold_Blooded (TRUE).	[CO2]	[2X4]															
Q3	Consider the tree below (MAX at root, depth=2, uniform branching=3). Leaf values row 1: [3, 5, 2], row 2: [9, 1, 7], row 3: [4, 6, 8]. Tasks :- 1. Using standard minimax, compute the root value. 2. Show α/β at each node if children are explored left→right. 3. Count how many leaves α - β prunes.	[CO4]	[3X3]															
Q4	Given the following table :- <table><tr><th>X1</th><th>X2</th><th>Y (Label)</th></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table> Answer the following :- 1. What will be the information gain for splitting on X1. 2. Give one valid weight vector (w1,w2)(w1,w2) and bias bb for a single-layer perceptron that can be implemented on the given table.	X1	X2	Y (Label)	0	0	0	0	1	0	1	0	0	1	1	1	[CO3]	[2X5]
X1	X2	Y (Label)																
0	0	0																
0	1	0																
1	0	0																
1	1	1																