Course Code:	CST323	

VI Semester B.E. (Computer Science & Engineering) Examination

Artificial Intelligence

Time: 2 Hours]	[Max. Marks: 40

Instructions to Candidates:

1. All questions are compulsory.
2. All questions carry marks as indicated
3. Explain your answer with neat sketches, wherever applicable.

Question		Description of Question	Marks	CO
1.		Consider the 3-water jug problem, which is stated as follows: There are three jugs of capacity 8,5 and 3 liters. There is no mark on any jug. Initially the 8-liter jug is filled with water and other two jugs are empty. You cannot get water from any external source and you cannot pour water on the ground. How to get 4 liter of water in 8-liter jug. Determine state representation of 3-water-jug problem. Determine operators (rules) for 3-water-jug problem.	06	CO1
2.	**(a)**	Consider a state space where the start state is number 1 and each state k has two successors: numbers 2k and 2k + 1. **a**. Draw the portion of the state space for states 1 to 15. **b**. Suppose the goal state is 11. List the order in which nodes will be visited for iterative deepening search.	03	CO2
	(b)	Determine heuristic function for 8-Queen problem. Apply A* on 8-Queen problem for three iterations, with empty chessboard as initial state. Show frontier and explored lists.	04	CO2
3.	**(a)**	1. It is a crime for an American to sell weapons to hostile nations. 2. Nono has some missiles. 3. All of its missiles were sold to it by Colonel West. 4. All missiles are weapons. 5. Enemy of America counts as hostile. 6. Colonel West is American. 7. Nono, an enemy of America. Solve the following, a) Represent these facts using predicate logic. b) Convert all these facts into Prenex normal form. c) Convert all these facts into skolem normal form. d) Answer the question "Is Colonel West Criminal?"	07	CO3
4.	**(a)**	Consider the joint probability distribution of three random variables in the following Table.	04	CO4

	Toothache		¬Toothache	
	Catch	¬Catch	Catch	¬Catch
Cavity	0.108	0.012	0.072	0.008
¬Cavity	0.016	0.064	0.144	0.576

Find P(cavity|toothache).

	(b)	How operations union, intersection, and implication are defined in terms of membership functions on fuzzy sets. Explain with proper example.	03	CO4
5.	**(a)**	Construct decision trees to represent the following Boolean functions: (i) A OR [B AND C] (ii) [A AND B] OR [C AND D]	03	CO5
	(b)	Apply perceptron learning algorithm on NOT classification up to 1 epochs (2 iterations) with initial weight W0 = $[0.5, 0.3]^T$ and learning rate, c=1.	04	CO5
6.		Explain MYCIN based on following points 1.Domain 2.Knowledge representation 3.Inference mechanism	06	CO6