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Course: Artificial Intelligence & Expert Systems   **Course Code: CSAI7003**
Program: M.Tech. CSE   **Semester: I**
Duration: 03 hrs.   **Max. Marks: 100**

SECTION A
(Scan and upload)   **(5Qx 4M = 20 Marks)**

S. No.	Question	CO
Q 1	Explain Ignorable, Recoverable and Irrecoverable conditions with examples.	CO1
Q 2	Differentiate between Prepositional and Predicate Logic.	CO2
Q 3	Explain forward and backward chaining.	CO3
Q 4	Write a short note on reinforcement learning.	CO4
Q 5	Explain Expert System Shell with examples.	CO5

SECTION B
(Scan and upload)   **(4Qx10M = 40 Marks)**

Q 6	Consider the following Production system:	CO1
	There are two jugs, a 4-gallon one and a 3-gallon one. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug?	
	a) Identify the Start and Goal states and Production rules.	
	b) Draw the state-space search tree to find the first solution.	
Q 7	Consider A, B, C and D to be prepositional Symbols. Which of these formulae are Tautologies? Show by using truth table approach. a) $(A \leftrightarrow (B \wedge C))$ b) $(A \leftrightarrow B) \wedge (C \rightarrow D)$	CO2
Q 8	Differentiate between a) Non-monotonic and monotonic Reasoning b) Supervised and Unsupervised learning	CO3
Q 9	Discuss various learning methods in neural networks with suitable examples. **OR** Elaborate biological analogies with suitable examples. Discuss the concept of neurons and perceptron with example.	CO4

SECTION C
(Scan and upload)   **(2Qx 20M= 40 Marks)**

| Q 10 | a) Explain the concept of WFF using suitable example
b) Convert the following sentences into predicates:
    i.   John likes all kinds of food.
    ii. Apples are food.
    iii. Chicken is food.
    iv. Anything anyone eats and isn't killed by is food.
    v.   Bill eats peanuts and is still alive.
    vi. Sue eats everything Bills eats. | CO2 |

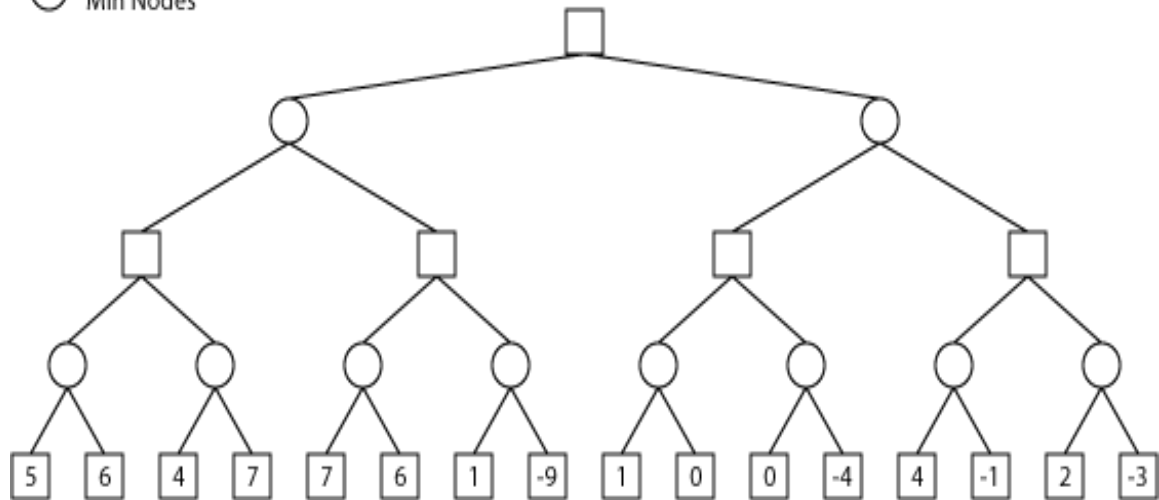| Q 11	Solve the following Crypt arithmetic Problem. Write Constraint equations and show all steps in finding solution.	
	$$\begin{array}{cccccc} & L & O & G & I & C \\ + & L & O & G & I & C \\ \hline P & R & O & L & O & G \\ \hline \end{array}$$ **OR** a) Explain Min-Max Procedure. b) Solve the following problem using Min-Max algorithm. ☐ Max Nodes ◯ Min Nodes	CO1