

**B. Tech. SEM -VII ( Computer) 2014 Course (CBCS) : SUMMER - 2019**  
**SUBJECT- ELECTIVE III: ARTIFICIAL INTELLIGENCE & ROBOTICS**

Day: Wednesday  
Date: 15/05/2019

S-2019-2807

Time: 02.30 PM TO 05.30 PM  
Max Marks: 60

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**N.B.:**

- 1) All questions are **COMPULSORY**.
  - 2) Figures to the right indicate **FULL** marks.
  - 3) Assume suitable data if necessary.
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- Q.1** Give the initial state, goal state, successor function and cost function for the following and solve the problem using Hill Climbing: (10)  
“ Given 3 jugs measuring 12 liters, 8 liters, and 3 liters and water tap. You can fill the jugs, and empty them from one to another or on the ground. The goal is to measure exactly 1 Liter water.”  
**OR**  
Explain the Minimax Algorithm to determine the optimal strategy for MAX to decide the best first move. (10)
- Q.2** Explain Uncertainty? Explain Bayesian network with example. (10)  
**OR**  
Briefly explain various methods of Knowledge Representation with example. Transform the Predicate Logic statements given below into equivalent conceptual graphs. (10)  
i)  $\forall x \text{ normal}(x) \wedge \text{grown}(x) \rightarrow \text{walk}(x)$   
ii)  $\forall x \text{ haswings}(x) \wedge \text{layseggs}(x) \rightarrow \text{bird}(x)$
- Q.3** Define Partial Order Planner. Explain STRIPS representation of planning problem. (10)  
**OR**  
Define Planning. Explain the components of planning system in detail. (10)
- Q.4** What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. (10)  
**OR**  
Describe the Digital Tree Algorithm with an example. (10)
- Q.5** Find Kinematic transformation matrix using D-H method for a robot. (10)  
**OR**  
What are the different types of robot drive system? Explain with advantages and disadvantages. (10)
- Q.6** Obtain Inverse Kinematic solution for 4-axis SCARA Robot. (10)  
**OR**  
Classify the robots according to the coordinates of motion with a sketch and example; explain the features of each type. (10)

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