Module-5

1. Prove that model checking algorithm can be done in polynomial time to the size of the Kripke structure and the length of the CTL formula.

2. What do you mean by the adequate set of temporal operators? List some adequate set of temporal operators.

3. Provide the algorithms for the temporal operators AF, EU and EX such that the future excludes the present.

4. What is state space explosion problem? Why state space explosion is disadvantageous for model checking algorithm.

4. Consider the microwave oven controller and give the state encoding. What are the Boolean expressions for the state transition diagram?

5. Identify some of the specifications of the microwave oven controller and represent them in CTL.

6. Consider the following systems and design a model for the system. Also indicate some properties of these systems and represent them in CTL.
   a) Elevator controller
   b) Traffic light controller
   c) Controller for ATM

7. What are the major disadvantages of Model Checking?

8. What is a fairness constraint? How to use the fairness constraints in model checking and what are the advantages of using fairness constraints.

9. What are fair paths in a model and how to identify these fair paths?

10. Give the outline of model checking algorithm with fairness constraints.