PART – A

1. What is a recursive function?
2. State any two differences between Permutations and Combinations.
3. Define atomic formula.
4. What are complement edges in a binary decision diagram?
5. Define lambda calculus.
7. What is a vertex cover of a graph?
8. Define Tree.
9. What is a State Transition Table?
10. What is Universal Turing Machine?

PART – B

11. a) Explain the following terms:
   i) Partially ordered set. (2)
   ii) Reflexive property (2)
   iii) Anti symmetric property (2)
   iv) Transitive property (2)
   v) Equivalence relation. (5)

   (OR)

   b) Explain the concept of Pigeonhole principle for the condition below:
   n = 10 pigeons and m = 9 holes.
12. a) Discuss in detail the syntax and semantics of Propositional logic.
   
   (OR)

   b) Explain the basics of answer generation in logic programming with appropriate examples.

13. a) Explain the following terms of Alpha reduction:
   
   i) Free and bound variables.
   
   ii) Name clashes and Alpha conversion.

   (OR)

   b) Explain Church Rosser's theorem and state its limitations.

14. a) Define Abstract Syntax Trees and explain the method of adding values to a binary Tree.

   (OR)

   b) Explain structure matching with lists.

15. a) Explain the following terms:
   
   i) UML state machines
   
   ii) SDL state machines.

   (OR)

   b) Describe Computability Thesis (Church's Thesis) with an example.

PART – C

16. a) Make a case study on the Elevator Problem using Petri Nets.

   (OR)

   b) Make a case study of a blackmail investigation scenario of a company secretary using finite state machines.