

- Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice,
ii) All parts of each questions are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numerical, Derivation, Design and Drawing etc.

Unit -1

1. a) Define O Notation.
- b) What is the use of Asymptotic Notations?
- c) Define Binary Tree.
- d) How Divide and conquer technique can be applied to binary trees? Also write Algorithm for Divide and conquer,

OR

Define and explain merge sort algorithm.

Unit -II

2. a) Explain about greedy technique.
- b) Define the external path length,
- c) Define minimum spanning tree,
- d) Define Kruskals algorithm. Also write down the steps for Kruskals algorithm in detail

OR

Define preorder, inorder and postorder traversal Also explain in detail all the traversal.

Unit- III

3. a) Explain principle of optimal ity.
- b) Define Dynamic programming.
- c) Define Binomial coefficient.
- d) Explain Warshalls algorithm.

OR

Find an optimal solution to the following Knapsack problem Number of objects $n = 3$ Knapsack capacity $m=20$ Profits (Pr, P2, P3) - (25, 24, 15) Weight (W1? W2, W3) - (18,15,10)

Unit IV

4. a) Explain state space tree.
- b) Explain-n queens problem,
- c) Explain "Graph coloring" problem.
- d) How can traveling salesperson problem be solved?

OR

Explain Backtracking in detail Algorithm write algorithm for recursive backtracking algorithm.

Unit - V

5. a) Explain Class P problem,
- b) Explain undecidable problem,
- c) Explain NP Hard problems
- d) List out the techniques for traversals in Graph. Also explain each in detail with its procedure.

OR

Discuss the relationship between P, NP, NP complete and NP hard problems.