

MCA DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Second Semester

MASTER OF COMPUTER APPLICATIONS

MCA507: Design and Analysis of Algorithms

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. What is algorithm?
2. Differentiate between ancestors and proper ancestors.
3. Define best case efficiency.
4. Which problem is known as single source shortest path problem?
5. Write the formulas of Master's Theorem.
6. Prove $x = n+1$ (x -External nodes and n -Internal nodes).
7. What is the input and output of Floyd's algorithm?
8. What is memory function?
9. What is backtracking?
10. What is the difference between optimal and feasible solution?

PART B (5 x 16 = 80 Marks)

11. a) Explain the fundamentals of algorithmic problem solving in detail.

(OR)

- b) Describe various properties of a tree with suitable examples.

12. a) Discuss various asymptotic notations with examples.

(OR)

- b) Explain Prim's algorithm with suitable example and analyze the efficiency.

13. a) (i) Write an algorithm to implement merge sort and analyze the efficiency. (12)
(ii) Write a short note on divide and conquer method. (4)

(OR)

- b) Write the algorithm to calculate the height of the binary tree and analyze the efficiency.

14. a) (i) Explain the algorithm to calculate binomial coefficient. (8)
(ii) Calculate binomial coefficient for $C(4, 3)$. (8)

(OR)

- b) (i) Explain optimal binary search tree algorithm. (6)
(ii) Construct the optimal binary search tree for the Keys A, B, C, D and their probability values 0.1, 0.2, 0.4, 0.3. (10)

15. a) (i) Describe subset sum problem. (6)
(ii) Solve subset for the set $S = \{3, 5, 6, 7\}$ and $d=15$, using backtracking. (10)

(OR)

- b) Discuss the knapsack problem using branch and bound method with suitable example.
