

[No. of Printed Pages – 4]

CSE303

Enrol. No.

[ET]

END SEMESTER EXAMINATION : APR.-MAY, 2017

ANALYSIS AND DESIGN OF ALGORITHMS

Time : 3 Hrs.

Maximum Marks : 70

Note: Attempt questions from all sections as directed.

SECTION – A (30 Marks)

Attempt any five questions out of six.

Each question carries 06 marks.

1. Use master's method to give tight asymptotic bounds for the following recurrences.

(a) $T(n) = 4T(n/2) + n$

(b) $T(n) = 4T(n/2) + n^3$

(c) $T(n) = 4T(n/2) + n \log n$

2. Describe approximate solution to an NP complete problem. Why would you prefer approximation method to solve travelling salesman problem ?

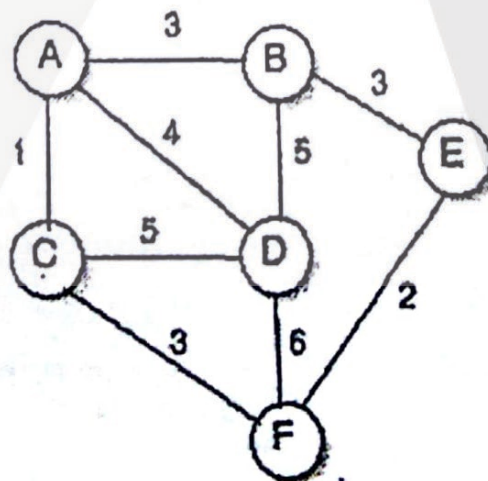
3. Write recurrence relation for the following program and solve.

P.T.O.

Fibnaccii(n)

```
{ if (n == 0)
    return 0;
  if (n == 1)
    return 1;
  else
    return fibnacci(n - 1) + fibnacci(n - 2); }
```

4. Analyze best case and worst case scenario of quick sort algorithm. Derive the asymptotic notion for the case where the probability of settling down the pivot element at the middle is almost 1.
5. Compare dynamic and greedy approaches to solve a problem.
6. Use prim's algorithm to find minimum spanning tree for the following graph.



SECTION – B (20 Marks)

Attempt any two questions out of three.

Each question carries 10 marks.

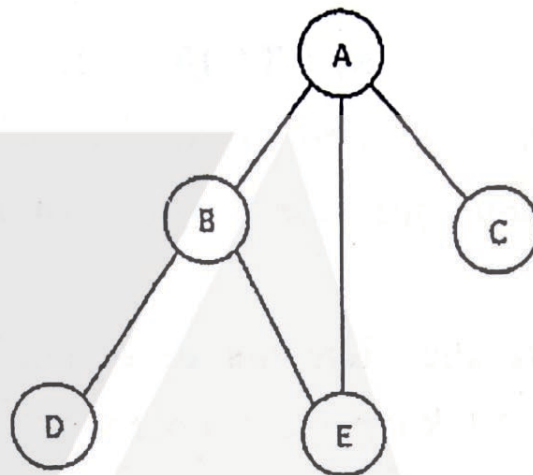
7. What are the elements of dynamic programming? What is 0/1 knapsack problem? Solve the following instance using Dynamic Programming, Knapsack capacity = 10, $P = \langle 1, 6, 18, 22, 28 \rangle$ and $W = \langle 1, 2, 5, 6, 7 \rangle$.
8. Differentiate between backtracking and Branch and bound approach. Write an algorithm for sum subset problem using back tracking approach.
9. Following are the dimensions of four matrices, How would you find the association of matrices, which require least multiplication operations? Also explain steps for matrix chain multiplication.

$$A_1 : 2 \times 3, \quad A_2 : 3 \times 6, \quad A_3 : 6 \times 4, \quad A_4 : 4 \times 5$$

SECTION – C (20 Marks)
(Compulsory)

10. (a) Write Depth First Search algorithm. Traverse following graph using DFS. (7)

P.T.O.



(b) Write algorithm to find longest common subsequence in two strings. (7)

(c) Discuss NP- Completeness and NP-Hardness with the help of a hypothetical example. (6)