

CSE303

Enrol. No.

[ET]

END SEMESTER EXAMINATION : NOV.-DEC., 2018

ANALYSIS AND DESIGN OF ALGORITHMS

Time : 3 Hrs.

Maximum Marks : 70

Note: *Attempt questions from all sections as directed.*

Use of Simple Calculator is allowed.

SECTION - A (30 Marks)

Attempt any five questions out of six.

Each question carries 06 marks.

1. (a) Explain the various criteria used for analyzing algorithms. (3)
- (b) List the properties of various asymptotic notations. (3)
2. Solve the recurrence relation :
 - (a) $T(n) = 7T(n/2) + n^2$
 - (b) $T(n) = 2T(n/2) + n$
 - (c) $T(n) = 4T(n/2) + \log n$

P.T.O.

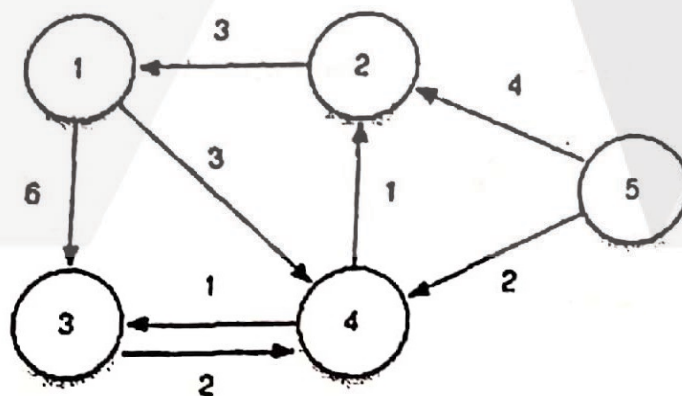
3. Discuss Quick sort algorithm with a suitable example and analyze the performance of Quick sort algorithm.

4. Solve the following instance of the 0/1, knapsack problem given the knapsack capacity is $W = 8$.

Items	Weight	Value
A	1	15
B	5	10
C	3	9
D	4	5

5. Define the concept of cost optimality with example.

6. Solve all pairs shortest path problem for the following graph using dijkstra algorithm.



SECTION – B (20 Marks)

Attempt any two questions out of three.

Each question carries 10 marks.

7. Discuss the difference between P, NP, NPC and NPH problems. Explain with examples.

8. (a) Solve the following recurrence relation using recursion tree : (5)

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

(b) Define spanning tree? Discuss the design steps in prims algorithm to construct minimum spanning tree with example. (5)

9. Write an algorithm to find all the occurrences of pattern $P[0..m-1]$ from a given string $str[0....n-1]$, where $n > m$. Analyse and Compare the time complexity of this algorithm with the naive approach.

SECTION – C (20 Marks)

(Compulsory)

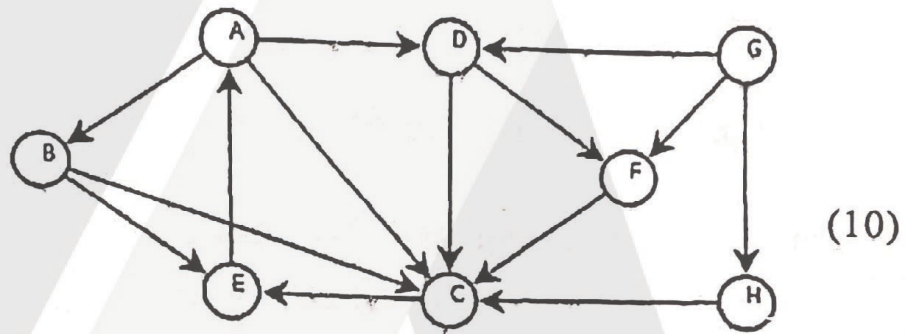
10. (a) Differentiate between Backtracking and Branch and Bound techniques. Write an algorithm for sum of subset using backtracking approach.

P.T.O.

Find all possible solution for $M=30$, write complete state space representation for given values.

$S = \langle 1, 2, 5, 7, 8, 10, 15, 20, 25 \rangle$ (10)

(b) Give the visited node order for each type of graph using DFS, starting with A, given the following figure :



(10)