Total No. of Pages:2

Vth SEMESTER

SUPPLEMENTARY EXAMINATION

Paper Code: SE-303

Time: 3:00 Hours

Roll No..........

B.Tech(SE)

(Feb– 2019)

Title: Algorithm Design and Analysis

Max. Marks: 50

Note: 1. Attempt any 5 questions where question No. 1 is compulsory.
2. Assume any suitable value(s) for missing data.
3.If asked to write algorithms, write as C functions or in pseudo code.

1. (a) Explain activity selection problem using greedy approach with suitable example?   [2]
   (b) Using divide and conquer approach find the k-th smallest element from an unsorted array using linear time algorithm.   [2]
   (c) Solve the following recurrence relation
   (i)$T(n) = 16T(n/4) + n^{3.5}$ [2]
   (ii) $T(n) = 20T(n/4) + n^{1.5}$ [2]

   (d)Consider a weighted complete graph G on the vertex set $\{v1,v2,vn\}$ such that the weight of the edge (vi, vj) is |i-j|. Find the weight of a minimum spanning tree of G is?   [2]

2. What do you mean by dynamic programming (DP) approach List the features supported by problems in order to apply dynamic programming. Solve longest common sequence (LCS) problem using DP by writing suitable recurrence relation and example?   [2+2+2+4=10]

3. Write the Bellman Ford algorithm for single source shortest path problem and by using this algorithm find the shortest path to all vertices for the given weighted graph assuming vertex A as source.   [10]
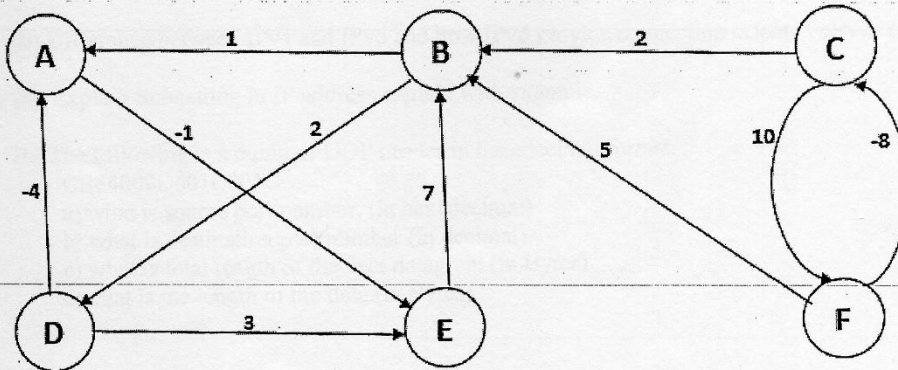
Q 4 (a) Apply Kruskal's algorithm to find MST for given graph and prove solution obtained is optimal. [7]
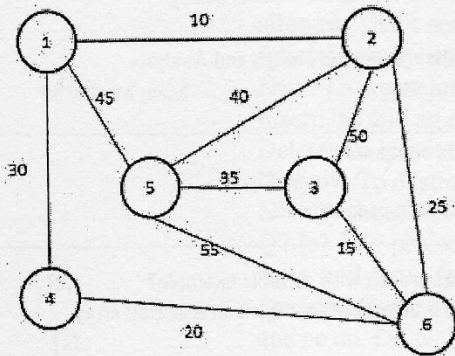
(b) Write the pseudo code to solve knapsack problem using greedy approach and find its time complexity.
[3]

5(a)How backtracking techniques are used to solve various problems? Explain how Subset sum problems can be solved using backtracking. [5]

(b) Write down the pseudo code for randomized quick sort and find its time complexity in worst case? [5]

6(a) What do you mean by NP complete and NP hard problems? Give examples for each. Prove that Vertex cover problem is a NP complete problem. [3+3=6]

6 (b) What do you mean heap data structure? Propose best algorithm to find 7th largest element in a max heap of n-elements and give its time complexity [1+3=4]