Z-11

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AJ—95—2013

FACULTY OF ENGINEERING

S.E. (CSE) EXAMINATION

NOVEMBER/DECEMBER, 2013

(New Course)

COMPUTER ALGORITHMS

(Friday, 20-12-2013) **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three Hours *Maximum Marks*—80

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Assume suitable data, if necessary.

(*iii*) Figures to the right indicate full marks.

Section A

1. Solve any *two* : 2×6=12

(*a*) Define computer algorithm. What kind of problem is solved by an algorithm.

(*b*) Write an algorithm of quick sort and sort the given array :

65, 70, 75, 80, 85, 60, 55, 50, 45.

(*c*) State and explain Master theorem.

P.T.O.

2. Solve any *two* : 2×7=14

(*a*) Determine asymptotic tight bound :

$$T(n) = 3T(n/4) + n \log n$$

verify using the substitution method.

(*b*) Illustrate the operation of Build max-heap on arrays :

A = {5, 3, 17, 10, 84, 19, 6, 22 9}

(*c*) Explain activity selection problem with example.

3. Solve any *two* : 2×7=14

(*a*) Explain the elements of dynamic programming.

(*b*) Compare Greedy method Vs. Dynamic programming. Which is more efficient ? Explain with an example.

(*c*) Determine LCS of :

X = {1, 0, 0, 1, 0, 1} and

Y = {0, 1, 0, 1, 1, 0, 1}.

Section B

4. Solve any *two* : 2×6=12

(*a*) Write Bellman-Ford algorithm.

(*b*) Explain disjoint set operation with applications.

(c) Construct MST using Kruskal's for the following graph :

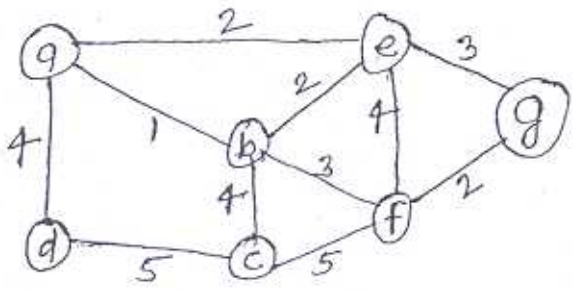

Fig. 1

5. Solve any *two* : 2×7=14

(a) Find an optimal parenthesization of Matrix chain product whose sequence of dimension <1, 2, 3, 4, 5, 6, 7>.

(b) Find the Huffman codes for the following set of sequence :

a : 1, b : 1, c : 2, d : 3, e : 5, f : 8, g : 13, h : 21.

(c) Explain class P, class NP and NP hard problem in detail.

6. Solve any *two* : 2×7=14

(a) Explain disjoint set forests in detail.

(b) Explain the properties of Greedy method.

P.T.O.

(c) Find single source shortest path in directed a cyclic graph :

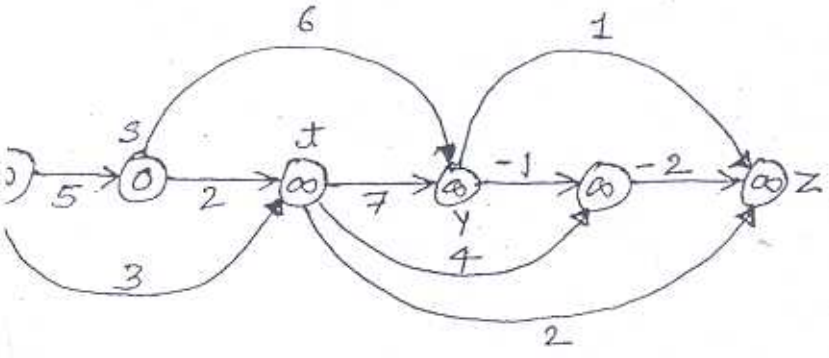

Fig. 2