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**BE—513—2012**

**FACULTY OF ENGINEERING**

**S.E. (CSE) EXAMINATION**

**MAY/JUNE, 2012**

**(New Course)**

**COMPUTER ALGORITHMS**

**(Tuesday, 12-6-2012)**

**Time : 10.00 a.m. to 1.00 p.m.**

**Time—Three Hours**

**Maximum Marks—80**

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

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

**Section A**

**1. Solve any two of the following :**

**2×6=12**

- (a) Write an algorithm for merge sort.**
- (b) State and explain Master's theorem.**
- (c) Write a note on algorithm as technology.**

**P.T.O.**

2. Solve any *two* of the following : 2×7=14

- (a) Determine upper bound for  $T(n) = 2T(n/2) + n$ . Verify solution using the substitution method.
- (b) Write an algorithm for MAX-HEAPIFY procedure.
- (c) Define computer algorithm. Explain all asymptotic notations.

3. Solve any *two* of the following : 2×7=14

- (a) Illustrate the operation of BUILD-MAX-HEAP on the array

$$A = \{5, 13, 2, 25, 7, 17, 20, 8, 4\}$$

- (b) Determine the LCS for  $x = \{A, B, C, B, D, A, B\}$

$$y = \{B, D, C, A, B, A\}$$

- (c) Compare divide and conquer method and dynamic programming.

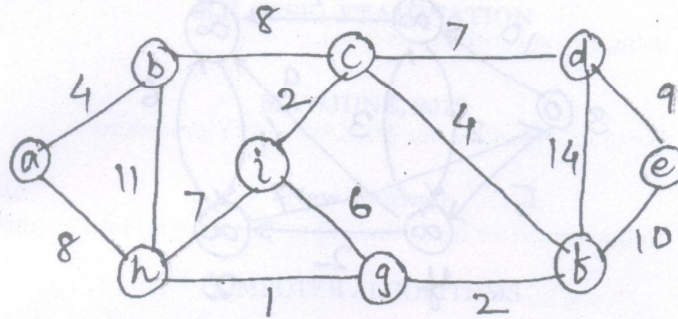
### Section B

4. Solve any *two* of the following : 2×6=12

- (a) Explain disjoint set operations with applications.



- (b) Construct minimum cost spanning tree for given graph using Prim's algorithm.



- (c) Define Reducability. Explain Cook's theorem.
5. Solve any *two* of the following : 2×7=14

- (a) Find an optimal parenthesization of matrix-chain product whose sequence of dimensions is {35, 15, 5, 10, 20}.
- (b) How many activities will be selected within given time of interval ?

$i$	1	2	3	4	5	6	7	8	9	10	11
$s_i$	1	3	0	5	3	5	6	8	8	2	12
$f_i$	4	5	6	7	8	9	10	11	12	13	14

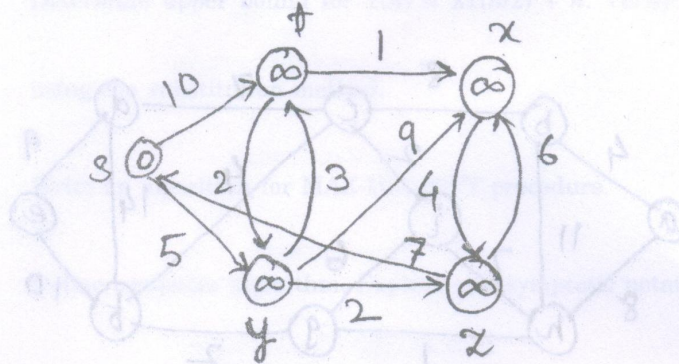
Where  $s_i$  is starting time and  $f_i$  is finishing time of activity.

- (c) Define :
- (i) NP—hard problems;
- (ii) Class P and NP.

6. Solve any two of the following :

2×7=14

(a) Execute Dijkstra's algorithm for given graph :



(b) Explain the properties of greedy method.

(c) Explain disjoint set forests in detail.

1	1	2	3	4	5	6	7	8	9	10	11
1	1	3	0	5	3	5	6	8	8	9	12
11	4	5	6	7	8	9	10	11	12	13	14