

5E3256-Q

Roll No. : _____

Total Printed Pages : **3****5E3256-Q**

B. Tech. (V Sem.) (Main/Back) Examination, December - 2011
Computer Science
5CS6.1 Advanced Data Structure
Common for Computer & IT

Time : **3 Hours**[Maximum Marks : **80**[Min. Passing Marks : **24****Instructions to Candidates :**

Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL2. NIL**UNIT - I**

- 1 (a) State the condition under which insertion of a vertex in a Red-Black tree will result in a sequence of recolouring steps that terminate with the root changing colour. 8
- (b) Will the root of Red-Black tree always be black after performing a deletion operation ? Justify with an example. 8

OR

- 1 (a) Construct a 2-3 tree for the list 9, 5, 8, 3, 2, 4 and 7 by successive insertion. 8
- (b) Define Dictionary and Dictionary with duplicates. List the operation performed on dictionary. 8

rtuonline.com

5E3256-Q



1

[Contd...

UNIT - II

- 2 (a) Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3, and 9. One at a time into an initially empty min heap ?

8

- (b) Explain the implementation of a binomial heap and its operation with suitable example.

8

OR

- 2 Write short note on :
 (a) Binomial trees
 (b) Implementing fibonacci heap

16

UNIT - III

- 3 A network $G = (V, E)$ as follows
 $V = \{a, b, c, d, e, f\}$
 $E = \{(ab, 2), (Cb, 2), (Cd, 2), (ed, 2), (ef, 2), (ac, 4), (be, 4), (df, 4)\}$

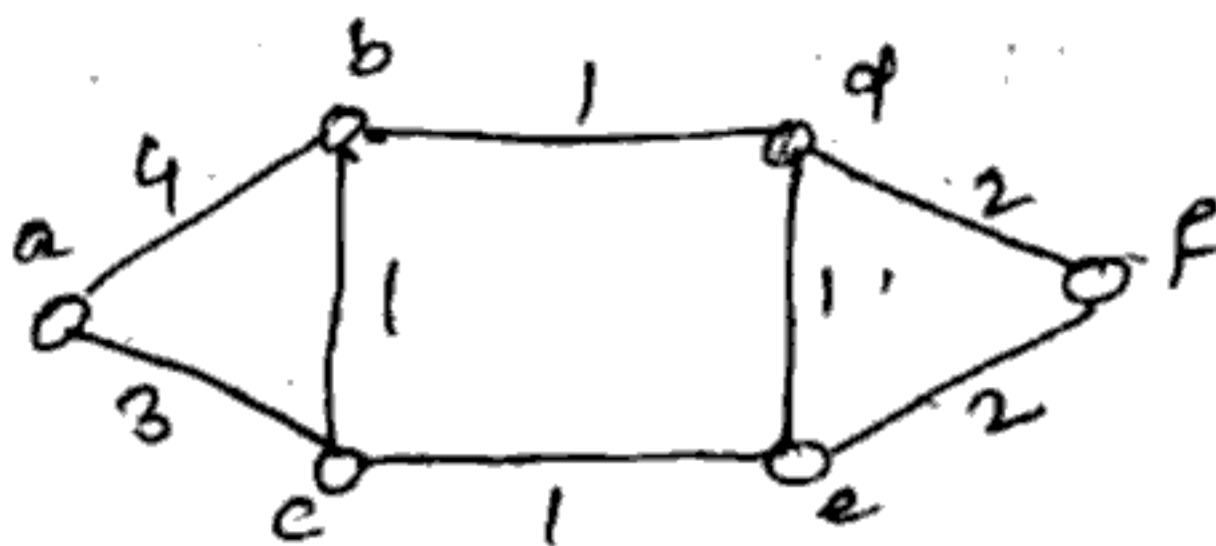
where the number following each edge is the capacity of that edge :

- (i) A function f is defined on the edge of G with each edge e having $f(e)$ equal to the capacity of e . Explain why this defines a valid st. flow on G for suitably chosen vertices S and t .
 (ii) State the Max-flow Min-cut theorem and explain how your answer to part (a) illustrate this theorem.

OR

- 3 Consider the following graph :

rtuonline.com



- (a) Apply Kruskal's algorithm to G. List the edge of the forest that is grown, in the order that they added. 10
- (b) What is the weight of minimum spanning tree in G ? 6

UNIT - IV

- 4 (a) What is zero-one principle ? Describe in detail. 8
- (b) Prove that if a comparison network with n input sorts all 2^n binary string of length n correctly, then it sort all sequence correctly. 8

OR

- 4 (a) Explain the bitonic sorting network with suitable example. 8
- (b) Write short note on : 8
- (i) Priority Queue
- (ii) Operations on disjoint sets.

UNIT - V

- 5 (a) Describe the Chinese remainder theorem. 8
- (b) What is Division theorem ? Explain. 8

OR

- 5 Write short note on : 16
- (a) Computation of Discrete logarithm
- (b) Modular Arithmetic