

B.Tech II Year I Semester (R13) Regular & Supplementary Examinations December 2015

DATA STRUCTURES
(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Write down the applications of stacks.
 - What is abstract data type? Write the abstract data type for stack.
 - Give brief description on the variations of insertion.
 - List the various representations of a tree? Give example for each.
 - Write an algorithm to determine the connected components.
 - Which data structure is used efficiently to reduce the ordered map? What is its average time complexity?
 - Write the class definition of a double – ended priority queue.
 - Let r be the root of the leftist tree that has n (internal) nodes. Prove that $n \geq 2^{\text{shortest}(r)-1}$.
 - What are the different types of characterization rotations available for AVL trees?
 - Define a B – tree. List the properties of B – trees.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 With the help of a neat sketch, explain Software Development Life Cycle.
Give brief description about the linked representation of stacks.

OR

- 3 (a) What is linked list? Explain insertion of a new node into single linked list at various possible positions.
(b) Distinguish between tree, binary tree and binary search tree.

UNIT – II

- 4 What is time complexity? Derive the average case time complexity for quick sort.

OR

- 5 What is meant by traversal? With the help of an example, explain the various tree traversal techniques.

UNIT – III

- 6 List the applications of graphs? Explain the common graph representation techniques.

OR

- 7 When dynamic hashing will be used? Describe the various dynamic hashing techniques with suitable example.

UNIT – IV

- 8 What are Meldable priority queues? Explain them with suitable example.

OR

- 9 Give brief description about the Binomial Heaps.

UNIT – V

- 10 Construct optimal binary search tree from the data: Let $n = 4$ and $(a_1, a_2, a_3, a_4) = (10, 15, 20, 25)$. Let $(p_1, p_2, p_3, p_4) = (3, 3, 1, 1)$ and $(q_0, q_1, q_2, q_3, q_4) = (2, 3, 1, 1, 1)$.

OR

- 11 (a) Distinguish between B – tree and B⁺ – Tree.
(b) Write short notes on Red – Black trees.
