

## B.Tech II Year I Semester (R13) Supplementary Examinations June 2017

**DATA STRUCTURES**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- What is data structure? In what areas do the data structures applied?
  - What is LIFO?
  - What are the methods available in storing sequential files?
  - Define Binary Search Tree. Give example.
  - Draw the node structure of adjacency multilist. Given example.
  - What are the types of Collision Resolution Techniques and the methods used in each type?
  - Write the steps in decreasing the key in Fibonacci heap.
  - Define shortest(x) for the leftist trees.
  - Define AVL Tree.
  - Create a B – tree of order 2 – 3 for the data {40, 10, 20, 70, 80}.

**PART – B**

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

**UNIT – I**

- 2 Write the procedure to convert an infix expression into postfix form. Convert the following infix expression into post fix by using the above procedure.

$$x + y * z + (p * q + r) * s.$$

**OR**

- 3 (a) Write an algorithm to delete an element from circular queue.  
(b) What is a queue? Explain the array representation of it with suitable example.

**UNIT – II**

- 4 (a) Construct the binary tree for the following sequence of nodes in preorder and inorder respectively.  
Preorder : G, B, Q, A, C, K, F, P, D, E, R, H  
Inorder : Q, B, K, C, F, A, G, P, E, D, H, R  
(b) Give brief description about the sorting of elements by using merge sort.

**OR**

- 5 List the operations that can be performed on trees. Explain the tree traversal techniques with suitable example.

**UNIT – III**

- 6 Draw a picture of the directed graph specified below:  $G = (V, E)$   $V(G) = \{1, 2, 3, 4, 5, 6\}$  and  $E(G) = \{(1,2), (2, 3), (3, 4), (5,1), (5, 6), (2, 6), (1, 6), (4, 6), (2, 4)\}$ . Obtain the following for the above graph:  
(i) Adjacency matrix. (ii) Reach ability matrix.

**OR**

- 7 Define hashing. Give brief description about the following with suitable example:  
(a) Division method.  
(b) Mid square method.  
(c) Folding method.  
(d) Digit analysis.

**UNIT – IV**

- 8 Sort the following list by using Max Heap Sort technique and Write the intermediate steps:  
20, 12, 25, 6, 10, 15, 13.

**OR**

- 9 (a) Write short notes on skip lists.  
(b) How can we insert an element into a binomial heap? Explain with example.

**UNIT – V**

- 10 With the help of suitable example, explain the AVL Tree double rotations.

**OR**

- 11 Give brief description about the following trees:  
(a) Splay Trees.  
(b) Red Black Trees.

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