**Reg. No. :** | | | | | | | | | | |

## Question Paper Code: 51832

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Information Technology

15UIT302 - DATA STRUCTURES AND ALGORITHMS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. If linked lists are required and pointers are not available, then _____ implementation must be used

   (a) Array (b) Cursor (c) Heap (d) Set

2. The Preorder traversal of the given inorder traversal is

   (a) */+a*bcd* (b) *ab/*cd+* (c) */*+abcd* (d) */*ab+cd*

3. _____ is a self-adjusting Binary Search Tree with the additional property that recently accessed elements are quick to access again.

   (a) Splay Tree (b) AVL Tree (c) Binary heap (d) B-Tree

4. _____ has the disadvantage of requiring pointers.

   (a) Double hashing (b) Open hashing
   (c) Closed hashing (d) Open addressing

5. A connected undirected graph is _____ if there are no vertices whose removal disconnects the rest of the graphs.

   (a) Digraph (b) Unweighted
   (c) Weighted (d) Biconnected

PART - B (5 x 3 = 15 Marks)

6. List the applications of a stack.

7. Write the recursive procedure for finding the minimum element in a a binary search tree.

8. Define a binary heap.

9. How is hashing performed in separate chaining?

10. What are the different methods of representing a graph?

PART - C (5 x 16 = 80 Marks)

11. (a) Explain in detail the various operations involved in implementing a Linked list. (16)

Or

(b) How will you implement a Queue? Explain with suitable routines and examples. (16)

12. (a) Explain in detail about the different tree traversals available. Draw the expression tree for the expression '*a/b*(c-d)+e*' and find the traversals for the tree. (16)

Or

(b) Write the necessary function to implement a binary search tree.

(i) Find the position of an element

(ii) Find the maximum element in the tree

(iii) Inset an element into the tree

(iv) Remove an element from the tree (16)

13. (a) How is an AVL tree implemented? How is balancing performed in an AVL tree? Explain with necessary examples and routines. (16)

Or

(b) Explain in detail the implementation of Binary heap with suitable examples. (16)

14. (a) What is the purpose of hashing? Explain in detail the different methods of hashing. (16)

Or

(b) Explain in detail about smart union algorithms and path compression. (16)

15. (a) With an example, explain how topological ordering of vertices is found in a graph. (16)

Or

(b) Define Minimum Spanning Tree. What are the methods available to find the same? Explain with necessary routines and examples. (16)

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