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**Question Paper Code: 50232**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Computer Science and Engineering

15UCS302 - DATA STRUCTURES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- The depth of complete binary tree is given by
  - $Dn = n \log_2 n$
  - $Dn = n \log_2 n + 1$
  - $Dn = \log_2 n$
  - $Dn = \log_2 n + 1$
- Leaves of the \_\_\_\_\_ trees are at the same level?
  - B
  - B+
  - B-
  - Binary
- The minimum number of elements in a heap of height h is
  - $2^{h+1}$
  - $2^h$
  - $2^h - 1$
  - $2^{h-1}$
- A technique for direct search is
  - Binary Search
  - Linear Search
  - Tree Search
  - Hashing
- How many nested loops are present in Prim's Algorithm
  - 1
  - 2
  - 3
  - 4

PART - B (5 x 3 = 15 Marks)

- How many null nodes will a binary tree with 20 nodes have.

7. Define red black tree.
8. Illustrate the decrease key operation in a heap tree.
9. What is Rehashing?
10. What are the kinds of graphs?

PART - C (5 x 16 = 80 Marks)

11. (a) Explain binary search and write a function to search an element from a list of n elements. (16)

Or

- (b) Explain threaded binary tree in detail. (16)

12. (a) Explain in detail about AVL TREES. (16)

Or

- (b) Write binary search algorithm and trace to search element 91 in following list:  
13 30 62 73 81 88 91. (16)

13. (a) Explain insertion and deletion operations in heap. (16)

Or

- (b) Give a mathematical expression that describes the heap property for a binary tree. (16)

14. (a) Define Hashing. How do collisions happen during hashing? Explain the different techniques resolving of collision. (16)

Or

- (b) Explain rehashing, extendible hashing and its applications in detail. (16)

15. (a) Explain in detail the Dijkstra's single source shortest path problem with example. (16)

Or

- (b) Obtain minimum spanning tree by Kruskal's algorithm. (16)