

Total No. of Questions—8]

[Total No. of Printed Pages—2

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[5352]-568

**S.E. (Computer Engineering) (II Sem.) EXAMINATION, 2018**  
**ADVANCED DATA STRUCTURES**  
**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

- N.B. :—** (i) Answer to the questions (Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8).
- (ii) Assume suitable data, if necessary.
- (iii) Draw neat labelled diagram wherever necessary.
- (iv) Figures to the right indicate full marks.

**Q.1**

- a. Write an algorithm to delete node from BST. [6]
- b. Write an algorithm for Preorder traversal of binary tree and give suitable example. [6]

**OR**

**Q.2**

- a. Draw any directed graph with minimum 6 nodes and represent graph using adjacency matrix, adjacency list, adjacency multilist and inverse adjacency list. [6]
- b. Consider the graph represented by following adjacency matrix –

|   | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 0 | 3 | 1 | 6 | 0 | 0 |
| 2 | 3 | 0 | 5 | 0 | 3 | 0 |
| 3 | 1 | 5 | 0 | 5 | 6 | 4 |
| 4 | 6 | 0 | 5 | 0 | 0 | 2 |
| 5 | 0 | 3 | 6 | 0 | 0 | 6 |
| 6 | 0 | 0 | 2 | 2 | 6 | 0 |

And find minimum spanning tree of this graph using Prim's algorithm [6]

**Q.3**

- a. Construct hash table of size 10 using linear probing without replacement strategy for collision resolution. The hash function is  $h(x) = x \% 10$ . Consider slot per bucket is 1.  
31, 3, 4, 21, 61, 6, 71, 8, 9, 25 [6]
- b. Explain about a skip list with an example. Give applications of skip list [6]

P.T.O.

**OR**

**Q. 4**

**a.** Construct the AVL tree for the following data by inserting each of the following data item one at a time

10, 20, 15, 12, 25, 30, 14, 22, 35, 40 [6]

**b** Explain following-

**i.** Static and dynamic tree tables with suitable example. [3]

**ii.** Dynamic programming with principle of optimality. [3]

**Q.5**

**a.** Write an algorithm to arrange numbers in ascending order using heapsort. Arrange the following numbers in ascending order using heapsort :

48, 0, -1, 82, 10, 2, 100 [7]

**b.** Construct B+ tree of order 3 for the following data:

1,42,28,21,31,10,17,7,31,25,20,18 [7]

**OR**

**Q. 6**

**a.** Build the min-heap for the following data:

25, 12,27,30,5,10,17,29,40,35

After creation of min-heap perform one delete operation on it and show the final min-heap

[8]

**b.** Write short note on:

[6]

**i.** Red-black tree

**ii.** K-dimensional tree

**Q. 7**

**a.** Explain Linked organization of a file

[6]

**b.** Define sequential file organization. Explain advantages of indexing over sequential file. [6]

**OR**

**Q. 8**

**a.** Define sequential file organization. Write pseudo code for insertion of records in sequential file [6]

**b.** Explain any two types of indices. [6]