Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5459]-192

S.E. (CE) (Second Semester) EXAMINATION, 2018

ADVANCED DATA STRUCTURES

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer to the questions Q. **1** *or* Q. **2**, Q. **3** *or* Q. **4**, Q. **5** *or* Q. **6**, Q. **7** *or* Q. **8**.

(*ii*) Assume suitable data, if necessary.

(*iii*) Draw neat labelled diagram wherever necessary.

(*iv*) Figures to the right indicate full marks.

1. (*a*) Let characters a, b, c, d, e, f have probabilities 0.07, 0.09, 0.12, 0.22, 0.23, 0.27 respectively. Find an optimal Huffman code and draw Huffman tree. What is the average code length ? [6]

(*b*) Write an aigorithm for Preorder traversal of binary tree and give suitable example. [6]

Or

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]

P.T.O.

(*b*) Consider the graph represented by the 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]

3. (*a*) Explain about a skip list with an example. Give applications of skip list. [6]

(*b*) What is hash function ? Enlist characteristics of a good hash function. Explain modulo Division and folding method. [6]

Or

4. (*a*) Construct the AVL tree for the following data by inserting each of the following data item one at a time : [6]

10, 20, 15, 12, 25, 30, 14, 22, 35, 40

(*b*) Explain the following :

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

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

5. (*a*) Write an algorithm to arrange numbers in ascending order using heapsort. Arrange the following numbers in ascending order using heapsort : [7]

48, 0, –1, 82, 10, 2, 100

(*b*) Construct B+ tree of order 3 for the following data : [7]

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

Or

6. (*a*) Build the min-heap for the following data : [8]

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.

(*b*) Write short notes on : [6]

(*i*) Red-black tree

(*ii*) K-dimensional tree.

7. (*a*) Explain any *three* operations carried out on sequential file. Write pseudo code for each these three operations. [6]

(*b*) Explain Linked organization of a file. [6]

Or

8. (*a*) Define sequential file organization. State advantages and disadvantages of sequential file organization. Write pseudo code for insertion of records in sequential file. [6]

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