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

ADVANCED DATA STRUCTURES

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

:— (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.

- (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 algorithm for Preorder traversal of binary tree and give suitable example. [6]

Or

- (a) Draw any directed graph with minimum 6 nodes and represent graph using adjacency matrix, adjacency list, adjacency multilist and inverse adjacency list. [6]

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- (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]

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2) 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

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.

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

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]