

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 algorithm 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]