

NTK/KW/15/7377

Faculty of Engineering & Technology
Fourth Semester B.E. (Comp. Tech.) (C.B.S.)
Examination

DATA STRUCTURE AND PROGRAMME DESIGN

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve **SIX** questions as follows :

Question No. 1 **OR** Question No. 2

Question No. 3 **OR** Question No. 4

Question No. 5 **OR** Question No. 6

Question No. 7 **OR** Question No. 8

Question No. 9 **OR** Question No. 10

Question No. 11 **OR** Question No. 12.

1. (a) Write a program to implement Binary search algorithm (using recursion). 7

(b) Explain heap sort in detail with suitable example. 6

OR

2. (a) What is meant by sparse matrix? Write a program to store sparse matrix in 3-tuple form. 7

(b) An array is given as follows :

77, 33, 44, 11, 88, 22, 66, 55

Show step-wise sorting of the array using selection sort. Also specify its time complexity. 6

3. (a) Write a program to implement Insert and Delete operations on queue and display the contents of the queue. 7

(b) Write a procedure for evaluation of postfix expression. Compute and show the evaluation of following postfix expression using stack :

5, 4, 3, +, *, 2, 7, 8, +, -, *. 7

OR

4. (a) Write the difference between plain and circular queue. Implement the circular queue for the following operations :

A circular queue with 6 rooms, insert 99, 88, 66, 55 and 44 remove 99 and 88 then insert 33, 22 and 11. 10

(b) Write short note on multiple stacks and queues. 4

5. (a) Write a C program to create single linked list. Also write following functions :

(i) Display (to display the list)

(ii) Count (to count the no. of nodes)

(iii) Search (to search given item in the list). 10

(b) What is linked list? How is it represented in memory? 3

OR

6. (a) Define doubly linked list. Write a program to insert a node :

(i) At the beginning

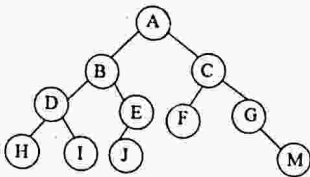
(ii) At the end. 6

(b) Write a C program to concatenate two circular linked lists into single circular linked list. 7

7. (a) Draw all possible binary trees using three nodes. 3

(b) State the difference between Binary Tree and Binary Search Tree. 4

- (c) Find preorder, postorder and inorder for the following :

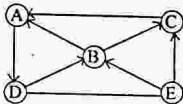


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OR

8. (a) Write and explain working of non-recursive procedure for traversing a binary tree in post order. 6
 (b) Construct a binary search tree from the following data : 7
 43, 49, 9, 20, 33, 31, 2, 4, 1, 57, 47, 55.

9. (a) For the following graph write :
 (i) Adjacency list
 (ii) Adjacency matrix
 (iii) Adjacency multilist representation.



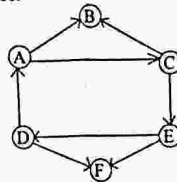
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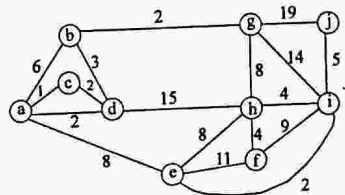
- (b) Write down breadth first and depth first traversal order starting at A for the given graph. Also draw BFS tree.



7

OR

10. (a) Discuss Dijkstra's shortest path algorithm properties. 4
 (b) What is the weight of a minimum spanning tree of the following graph ? Show stages in establishing a MST. 9



9

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(Contd.)

11. (a) Using division remainder method of hashing for tables and size 11, store the following numbers in hash table :

25, 42, 96, 101, 102, 162, 197, 201.

Use chaining, linear, quadratic probing method for collision handling. 8

- (b) What is hashing ? Explain various hashing techniques. 6

OR

12. Write short notes on :

- (i) Sorting with disks and tapes. 5
- (ii) Advantages and disadvantages of sequential file. 4
- (iii) Direct file organization. 5