B.E. Fourth Semester (Computer Technology) (C.B.S.)

Data Structures & Program Design Paper – II

P. Pages : 2 **KNT/KW/16/7289**

Time : Three Hours * 0 1 5 7 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve six questions as follows:
3. Que. No. 1 OR Que. No. 2.
4. Que. No. 3 OR Que. No. 4.
5. Que. No. 5 OR Que. No. 6.
6. Que. No. 7 OR Que. No. 8.
7. Que. No. 9 OR Que. No. 10.
8. Que. No. 11 OR Que. No. 12.

1. a) Write down the algorithm for merge sort and sort the sequence of following numbers using an algorithm. **8**
45, 23, 11, 35, 67, 87, 24, 66.

b) Write the binary search algorithm. **5**

OR

2. a) Write down the algorithm for quick sort and simulate the sequence. **9**
42, 23, 74, 11, 65, 57, 94, 36, 99, 87, 70.
Also discuss its time complexity.

b) Write the linear search algorithm. **4**

3. a) Implement typical stack operations using a linked list. **8**

b) Convert the following infix expression into postfix notation. Denote the stack used for it. **6**
A + (CB – C * D) / E) + F – G / H

OR

4. a) Write down the insertion and deletion process in a circular queue. Explain with example. **10**

b) Explain the purpose of a stack in a recursive procedure. **4**

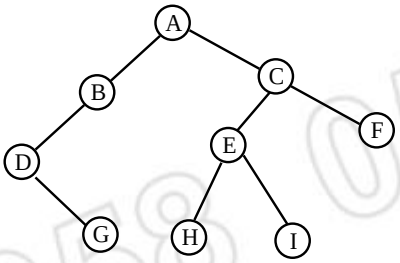
5. What is doubly linked list? Write down the algorithm for inserting a node to the beginning and deleting a node from a doubly linked list. **13**

OR

6. a) Write an algorithm to add two polynomials where the polynomials are represented using singly linked list. **8**

b) Explain different dynamic memory allocation functions. **5**

7. a) Explain various kinds of traversals in a binary tree and illustrate the same for following example. **9**



b) Write non-recursive procedure for preorder traversal of binary tree. **5**

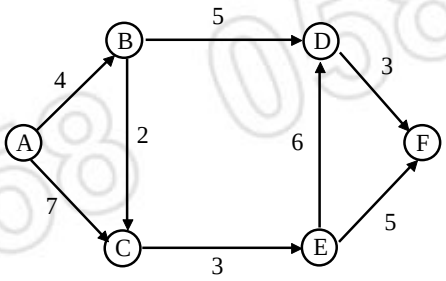
OR

8. a) Define & explain with example. **14**

i) Tree
ii) Binary tree
iii) Binary search tree
iv) Complete Binary tree
v) Full Binary tree
vi) A V L tree
vii) Threaded Binary tree.

9. a) Explain the depth first search on any graph with suitable example. **7**

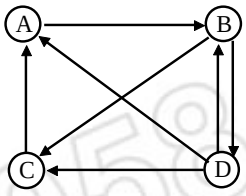
b) Find the minimum spanning tree for the following graph. **6**



OR

10. a) Explain Breadth first search on a graph with suitable example. **7**

b) Write down the adjacency matrix, adjacency list & adjacency multilist for the following graph. **6**



11. a) Explain different Hashing Techniques. **7**

b) Discuss sorting with disks and tapes. **6**

OR

12. Write short note on following.

i) Direct access file. **3**
ii) Indexed sequential file. **4**
iii) Sequential files. **3**
iv) Storage structure on disks. **3**

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