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B.E.Fourth Semester (Computer Science & Engineering) (C.B.S.)

Data Structure & Program Design

P. Pages : 3 **NKT/KS/17/7294**

Time : Three Hours * 0 6 8 7 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.

1. a) How to decide performance of an algorithm ? Explain big O notation in brief. **6**

b) Explain the concept of data structure in detail. Also explain abstract data type. **7**

OR

2. a) Give the snapshots of searching an element using linear and binary search in the given array. 20 91 32 81 75 48 05 19 08.
Also comment on time complexity. **7**

b) Write a C program to sort the elements of matrix row wise Assume that the matrix is represented by two dimensional array. **6**

3. a) Give suitable representation for a polynomial and write an algorithm to add two polynomials. **8**

b) What are different functions for dynamic memory allocation in 'C' ? Explain with examples. **6**

OR

4. a) What is Doubly Linked list ? Write an algorithm to reverse the links of singular linear linked list ? **8**

b) Write a note on : **6**
i) Singly linked list

ii) Circular linked list.

5. a) Explain polish notations. Convert the following notation to postfix using stack. Show all stack positions **9**
$A + (B * C - (D / E \wedge F) * G) * H$

b) Explain and illustrate the concept of circular queue. **4**

OR

6. a) Write a program in C to implement a stack. You should write user defined functions for each valid operation on stack. **7**

b) Explain : **6**
i) Priority queue
ii) Doubly ended queue

7. a) Explain with suitable example the binary search tree and its applications. **7**

b) Construct a tree for following pre order and inorder traversal. **6**
Preorder : G B Q A C K F P D E R H
In order : Q B K C F A G P E D H R

OR

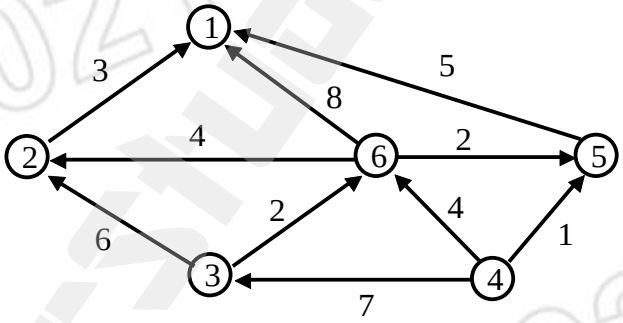
8. a) Write non-recursive algorithm for postorder traversal of a binary tree. **7**

b) Write a note on : **6**

i) AVL Trees

ii) Threaded Binary Tree

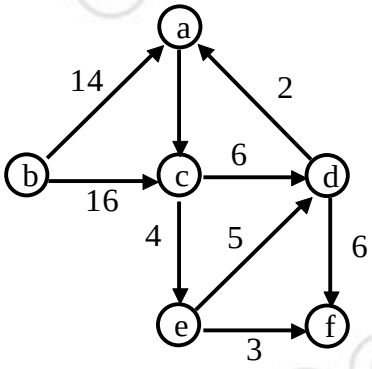
9. a) What is a graph ? Explain Also obtain for the following graph. **9**
i) Indegree & outdegree of each node ii) The adjacency matrix
iii) The adjacency list iv) The adjacency multilist



b) Differentiate between BFS and DFS techniques of graph traversal. **4**

OR

10. a) Construct a minimum spanning tree for the given graph using Kruskal's algorithm. **7**



b) Explain the following : **6**

i) Hamiltonian path

ii) Types of graphs

iii) Activity Networks

11. a) What is collision in hashing ? How can it be avoided ? What are different collision handling mechanism ? Explain each with suitable example. **9**

b) Explain open hash table and closed hash table. **5**

OR

12. a) What is symbol table ? What are different data structures used for symbol table ? Discuss. **7**

b) Give the following list of elements **7**
63, 92, 89, 12, 32, 90, 69, 96, 98, 91 use division
method of hashing to store the given values.

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The secret of getting ahead is getting started.

~ Mark Twain