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**Code No. : 13110 IDS**

# VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
### B.E. (CBCS) III-Semester Main Examinations, December-2017

## Introduction to Data Structures

Time: 3 hours                                                                                    Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

### Part-A (10 × 2 = 20 Marks)

1. Define data structure and List applications of data structures.

2. List and specify the various reasons why Linked list is better than an Array.

3. Write the conditions used to delete an element node form a doubly linked list.

4. Write a C code to implement StackFull and StackEmpty functions.

5. Convert the given infix expression a*(b+c)*d in to postfix using stacks.

6. Write Abstract data type of Queue.

7. Draw the List representation of the given tree.



8. What are the Binary Search tree properties?

9. Draw the Adjacent matrix representation of a given tree.



10. Differentiate Time and Space Complexities

### Part-B (5 × 10 = 50 Marks)

11. a) Explain the array doubling concept with an example.                                    [5]

    b) Write a C program to find the middle element in the linked list.                  [5]

12. a) Write about Doubly linked list.                                                          [5]

    b) Write the steps to delete a node from a doubly linked list.                      [5]

13. a) Write and explain the Queue ADT.                                                         [5]

    b) Convert the given infix expression ((((a/b)-c)+(d*e))-a*c)) into postfix expression with   [5]
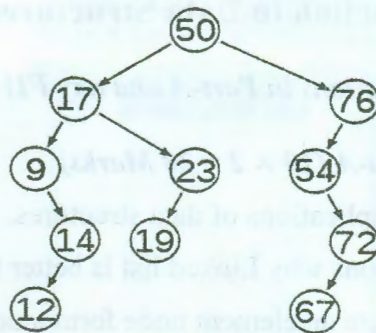    the help of stack.

14. a) Write C functions to implement Queue operations using arrays.  [5]

b) Show the binary tree traversals in order, pre order, post order and level order on the given tree.  [5]



15. a) Differentiate DFS and BFS techniques in graphs.  [5]

b) Perform the following operations on the given graph.  [5]

   i) Find in degree and out degree of each vertices

   ii) Write the Adjacent matrix

   iii) Write the Adjacent List.
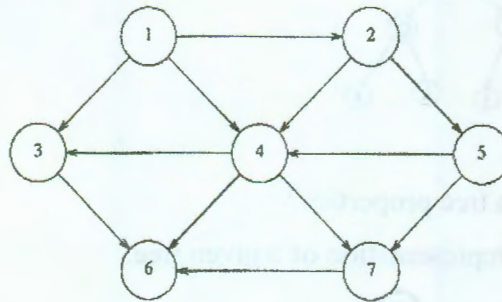


16. a) Write and Explain the Asymptotic Notations.  [6]

b) Find minimum cost spanning tree using Kurskal's algorithm for the given graph.  [4]
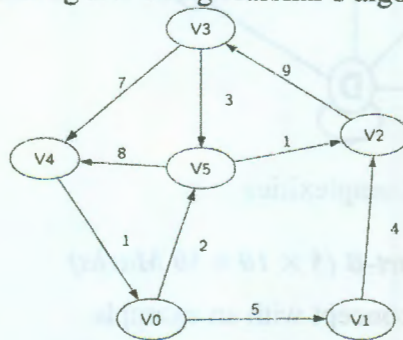


17. Answer any *two* of the following:

a) What are Self-referential Structures?  [5]

b) Explain Circular Queue.  [5]

c) Explain Spanning trees.  [5]

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