CHRIST UNIVERSITY,BENGALURU - 560029

End Semester Examination March - 2017

Master of Computer Applications II SEMESTER

Code: MCA232/MCS231 **Max.Marks: 100**

Subject: DATA STRUCTURES **Duration: 3Hrs**

SECTION A

Answer all the questions **5X20=100**

1 **a)** Prove that the average number of comparisons required for linear search is (n+1)/2. **(4)**

[OR]

2 **b)** What is a base case in recursive algorithm? Explain with suitable examples. **(6)**

3 **c)** Convert the following infix expressions to postfix form. **(10)**

(a) (X+Y)*(Z+B)*(C-D*(E-F/G))

(b) (A*B/C) *(P*(Q-R)/T)

[OR]

4 **a)** Write short notes on Multilinked Structures. **(4)**

5 **b)** Discuss the different operations performed on a data structure. **(6)**

[OR]

6 **c)** Convert the following infix expressions to prefix and postfix form. **(10)**

(a) A + B / (C + B * C - D * (E – F / G))

(b) (J * H) * (L / M + N) * (P / (Q – R) * T)

7 **a)** Is it possible to implement binary search in a Linked List. If yes, how? If not, why? Justify your answer with an example. **(10)**

[OR]

8 **b)** Write an algorithm to search for a specific item in a circular linked list. **(10)**

9 **a)** Write an algorithm to delete the node in the beginning of a singly linked list. **(10)**

[OR]

10 **b)** Develop an algorithm for inserting a node in a doubly linked list considering all the cases. **(10)**

11 **a)** How do you hash using digit extraction method? Explain with an example. **(4)**

[OR]

12 **b)** What do you mean by collision? Discuss any one method to overcome collision. **(6)**

13 **c)** Write and trace insertion sort algorithm by taking 8 elements and sort in descending order. **(10)**

[OR]

14 **a)** Explain midsquare hashing. **(4)**

15 **b)** Write an algorithm to search for string ***str1*** in string ***str2*****.** **(6)**

[OR]

16 **c)** Explain shell sort algorithm to sort the numbers in descending order with suitable examples. **(10)**

17 **a)** Write an algorithm to find the smallest element in a given Binary search tree. **(10)**

Create a Binary Search Tree using the following data entered in Sequential set:

53,78,12,35,87,23,57,29,41.

[OR]

18 **b)** Briefly discuss the advantages and limitations of AVL tree with respect to splay tree. Provide examples to justify each point. **(10)**

19 **a)** Suppose A, B, C, D, E, F, G and H are 8 data items and they are assigned weights as follows: **(10)**

Data item : A B C D E F G H

Weight : 22 5 11 19 2 11 25 5

Construct the tree T with minimum weighted path length using Huffman's algorithm.

[OR]

20 **b)** Explain how an AVL tree will balance itself, if the following numbers come in a sequential order: **(10)**

30,50,40,20,10,5,17,25,35,4

21 **a)** Explain Prim's algorithm with suitable graph. **(10)**

[OR]

22 **b)** How much space is required for a graph of n nodes in adjacency matrix and adjacency list representation? Which representation is better in terms of space complexity? **(10)**

23 **a)** i) Consider a weighted graph of your own with 6 vertices and generate a minimum spanning tree for the same. **(10)**

ii) Explain a degree of a vertex with the help of above example.

[OR]

24 **b)** Explain Breadth First Traversal method with respect to a graph. **(10)**