22.11.18(E)

K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam
Nov – Dec 2018

Max. Marks: 100 | **Duration: 3 hrs**
Class: SY B Tech | Semester: III
Name of the Course: Data Structures | Branch: CMPN
Course Code: **UCEC303**

Instructions:
(1) **All Questions are Compulsory**
(2) **Draw neat diagrams**
(3) **Assume suitable data if necessary**
(4) Write program / algorithm wherever applicable.

Question No.		Max. Marks
Q 1	**Answer any five questions**	**25**
Q 1 (a)	Discuss in brief the advantages of using linked lists over arrays.	
Q 1 (b)	What is use of ADT? Give an example for the Stack ADT.	
Q 1 (c)	Explain breadth first search with an example.	
Q 1 (d)	Give an example of expression trees as an application of the tree data structure. How is it useful?	
Q 1 (e)	What are the applications of searching and sorting?	
Q 1 (f)	What is recursion? How can you use recursion to compute sum of n natural numbers? Give function for the same.	
Q 1 (g)	Explain priority queue as an application of the heap data structure	
Q2 (a)	Write a program to implement a Doubly Linked List which performs the following operations: (i) Inserting element in the beginning (ii) Inserting element in the end (iii) Deleting a particular element (iv) Displaying the list **OR** Explain with a program how simulation can be carried out using a Queue Data Structure.	**10** **10**
Q 2 (b)	Write a program for DFS traversal of a graph. Explain its working with an example.	**10**
Q 2 (c)	What is a double ended queue? What are its variants? Explain in brief.	**05**
Q3 (a)	Write a program to evaluate a prefix expression. Explain the working with an example. **OR** Write a program to implement a Circular queue. The program should be able to perform the following operations: (i) Creating the queue (ii) Deleting from the queue (iii) Inserting in the queue (iv) Displaying the current elements of the queue	**10** **10**

Q 3 (c)	How can stack be represented as linked list?	05
Q 4 (a)	What is Hashing? Insert the following values in a hash table of size 10 using Quadratic Probing. Also find the number of collisions. 23, 13, 27, 65, 56, 41, 19, 26, 83, 67 **OR** Write a menu driven program to implement Insertion Sort and Selection sort. The program should ask the user to enter n elements and display the option for either insertion sort or selection sort. Depending upon the selection, the program should sort the elements.	10 10
Q 4 (b)	What is an AVL tree? Explain with example. Also explain the different rotations that are used while inserting an element into the tree.	10
Q 4 (c)	How can you solve sparse matrix addition using linked lists?	05
Q.3(b)	Create a BST for following numbers 26, 38, 15, 29, 33, 12, 20, 31, 18, 30 Write preorder and postorder traversal sequence of the same.	10