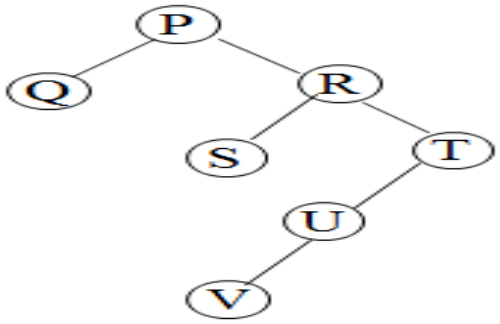
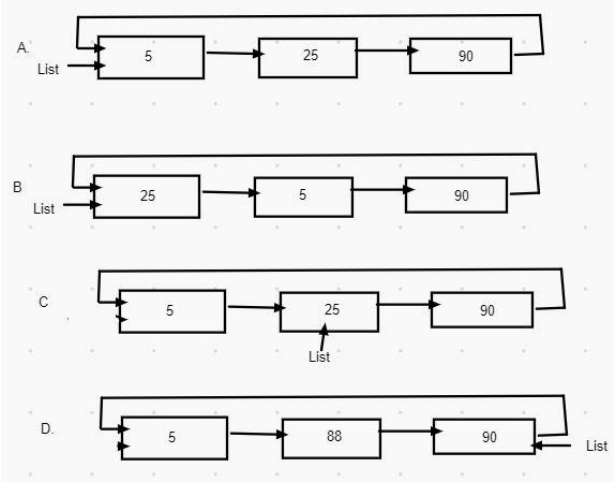
K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)
Semester: **August – November 2020**
In-Semester Examination

Class: SY B. Tech
Branch: Computer Engineering **Semester : III**
Full name of the course: Data Structures **Course Code: 2UCC302**
Duration: 1hr.15 min (attempting questions) +15 min (uploading) Max. Marks: 30

Q. No	Questions	Marks
Q1	Solve the following multiple choice questions	
1.1	Identify the data structure in following ADT initializeDS—Initializes the DS to an empty state. isEmptyDS—Determines whether the DS is empty. If the DS is empty, it returns the value true; otherwise, it returns the value false. insertDS—Adds a new element to the start of the DS. The input to this operation consists of the DS and the new element. Prior to this operation, the DS must exist. deleteDS—Removes the first element of the DS. Prior to this operation, the DS must exist and must not be empty. A. Stack B. Queue C. Tree D. Singly Linked List	1M
1.2	Which of the following is not a data structure? A. Stack B. Array C. Structure D. Queue	1M
1.3	Pick the correct prefix form to the given infix expression a*[b/(c-d)*f] A. *a/b*-cdf B. abcd-f*/* C. *a*/b-cdf D. *ab*/-cdf	1M
1.4	The following numbers are inserted into an empty binary search tree in the given order: 10, 22, 19, 15, 9, 18. Which of the following is the height of the binary search tree ? A. 4 B. 5 C. 6 D. 3	1M

1.5	Examine the Binary Search Tree shown below and Determine which of the following nodes that contains the second largest element  A. V B. U C. T D. P	1M
1.6	A circular queue is implemented using an array of size 8. The array index starts with 0, front is 6, and rear is 7. The insertion of the next element takes place at the array index of__ 1. 1 2. 7 3. 0 4. 8	1M
1.7	Which of the following is not a type of queue? 1. Deck 2. Input Restricted DEQUE 3. Output Restricted DEQUE 4. Single ended queue	1M
1.8	Choose correct output for the following sequence of operations. enqueue(3) enqueue(5) dequeue enqueue(1) enqueue(5) dequeue dequeue dequeue enqueue(6) dequeue 1. 3 5 1 5 6 2. 3 1 5 5 6 3. 5 5 1 3 6 4. 5 5 1 6 3	1M

1.9	Given a set of n elements, which of the implementation would allow faster random access of elements? A. Linked List B. Array C. Stack D. Doubly Linked List	1M
1.10	Given a sequence of operations performed on a sorted circular linked list as - Insert(25), insert(12), insert(90), delete(12), insert(5), insert(88), delete(88), the resultant circular linked list would look like--  	1M
Q. 2 A	Consider infix expression 4+3*(6*3-12). Make use of infix to postfix expression conversion algorithm (using single stack) and convert the expression from infix to postfix notation. What is the maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression? (Don't write Algorithm)	4+1M
Q. 2 B	What is a double ended queue? What are its types? Explain each type with suitable pictorial representation. OR Write a Pseudo code/algorithm for enqueue and dequeue operations for implementation of linear queue using array	5M
Q. 3 A	A binary tree has 9 nodes. The Inorder and preorder traversals yield the following sequence of nodes- Inorder=SQUTVPWRX Preorder=PQSTUVRWX Construct the binary tree corresponding to these traversals OR Construct an AVL Tree for the following sequence 9,8,7,15,16,17,18 Further mention the type of Rotation and the balance factors in each intermediated step	5M

Q. 3 B	Follow the given table and convert the array representation of linked list into "linked" node type representation. Comment on advantages of linked representation over array representation.	2M+3M

Index	Data	Next address index
0	12	4
1	56	11
2		
3		
4	98	7
Start/Head==>5	12	9
6		
7	77	-1
8		
9	6	1
10		
11	9	0
12		