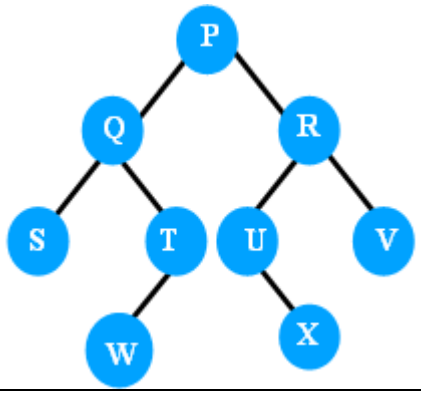
SOMAIYA VIDYAVIHAR UNIVERSITY

Semester: August 2021 – December 2021 **Examination: ESE Examination**		
Programme code: 01 (16) **Programme: B.TECH**	**Class:** SY	**Semester:** III **(SVU 2020)**
Name of the Constituent College: **K. J. Somaiya College of Engineering**	**Name of the Department** COMP /IT (Common for COMP/IT)	
Course Code: 116U01C302	**Name of the Course: Data Structures**	
Duration : 1 Hour 45 Minutes (15 minutes extra for uploading)	**Maximum Marks : 50**	
Instructions: **1)Draw neat diagrams 2) Assume suitable data if necessary**		

Question No.		Max Marks
Q1 (A)	1. If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as___ a) Underflow b) Garbage collection c) Overflow d) None of the above	01
	2. Which data structure is mainly used for implementing the recursive algorithm? a) Queue b) Stack c) Binary tree d) Linked list	01
	3. Which one of the following is the overflow condition if a circular queue is implemented using array having size MAX? a) rear= MAX-1 b) rear=MAX c) front=(rear+1) mod max d) front = MAX + 1	01
	4. Which of the following option is true if implementation of Queue is from the linked list? a) In enqueue operation, new nodes are inserted from the beginning and in dequeue operation, nodes are removed from the end. b) In enqueue operation, new nodes are inserted from the end and in dequeue operation, nodes are deleted from the beginning. c) In enqueue operation, new nodes are inserted from the end and in dequeue operation, nodes are deleted from the end.	01

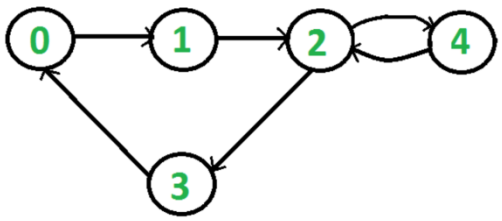
	d) Both a and b	
	5. Which of the following options is not true about the Binary Search tree? a) The value of the left child should be less than the root node b) The value of the right child should be greater than the root node. c) The left and right sub trees should not be a binary search tree d) The leaf nodes can be present at any level.	01
	6. What is the result of the following postfix expression? **ab*cd*+** where a=2,b=2,c=3,d=4. a) 16 b) 12 c) 14 d) 10	01
	7. What is an AVL tree? a) a tree which is balanced and is a height balanced tree b) a tree which is unbalanced and is a height balanced tree c) a tree with three children d) a tree with atmost 3 children	01
	8. A full binary tree can be generated using _____ a) post-order and pre-order traversal b) pre-order traversal c) post-order traversal d) in-order traversal	01
	9. Which of the following is not a technique to avoid a collision? a) Make the hash function appear random b) Use the chaining method c) Use uniform hashing d) Increasing hash table size	01
	10. In which case adjacency list is preferred in front of an adjacency matrix? a) Dense graph b) Sparse graph c) Adjacency list is always preferred d) Complete graph	01
Q1 (B)	Attempt any FIVE questions out of the following (any 5 out of 7)	

	1. Find the postorder traversal of the binary tree shown below 	02
	2. How do you count the number of elements in the circular linked list?	02
	3. Discuss set and map data structure.	02

	4. Consider the following in C programming language.
	
	struct node
	{ **int** data;
	struct node * next; }
	typedef struct node NODE;
	NODE *ptr;
	
	Which of the following c code is used to create new node? Explain the same.
	a) ptr = (NODE*)malloc(sizeof(NODE));
	b) ptr = (NODE*)malloc(NODE);
	c) ptr = (NODE*)malloc(sizeof(NODE*));
	d) ptr = (NODE)malloc(sizeof(NODE));
		02

	5. What will be the output of the following program?
	
	main()
	{ char str[]="Algorithms";
	int len = strlen(str);
	int i;
	for(i=0;i<len;i++)
	push(str[i]); *// pushes an element into stack*
	for(i=0;i<len;i++)
	pop(); *//pops an element from the stack*
		02

	6. Construct a binary search tree with given data: 10, 4, 3, 5, 11, 12, 14, 8, 1	02
	7. Using division method, in a given hash table of size 157, the key of value 172 be placed at which position?	02
Q. 2	Write pseudo code for polynomial addition using single linked list. Explain the logic with an example.	10

	OR Write algorithm for infix to postfix conversion. Convert A * (B + C) – D / E into postfix expression. Show all steps.	
Q. 3	Construct an AVL tree by inserting the following elements in the given order 63, 9, 19, 27, 18, 108, 99, 81 OR Write algorithm of BFS traversal of a graph. Show working of algorithm on the given graph.  	10
Q. 4	Write notes on any TWO 1. Dictionary ADT and application of Dictionaries 2. Insertion Sort 3. Collision handling techniques in hashing	10