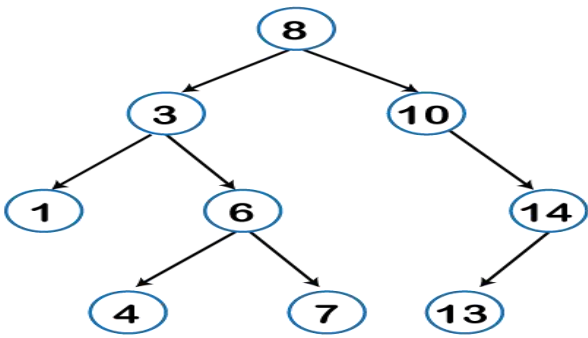


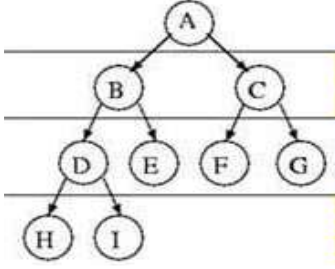
**I\_B.Tech II Semester****Subject Name: DATA STRUCTURES****Department : CSE****Faculty Name: D. SUGUNA KUMARI, R. SHANMUKHA  
SHALINI****EMP ID : 1228, 1446**< **Note:** Type the questions in the given format only, Times New Roman font , size 12 >**Instructions:**1. From **each unit 20 Five Marks** questions are mandatory.

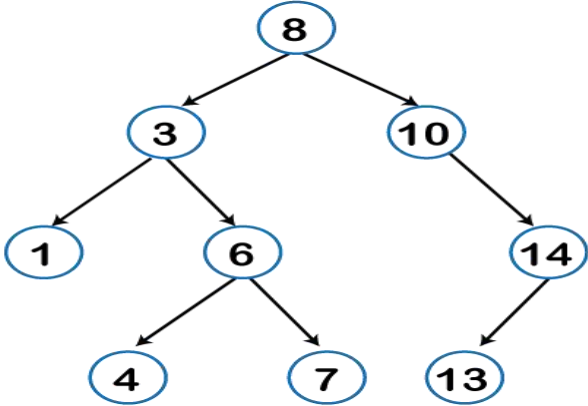
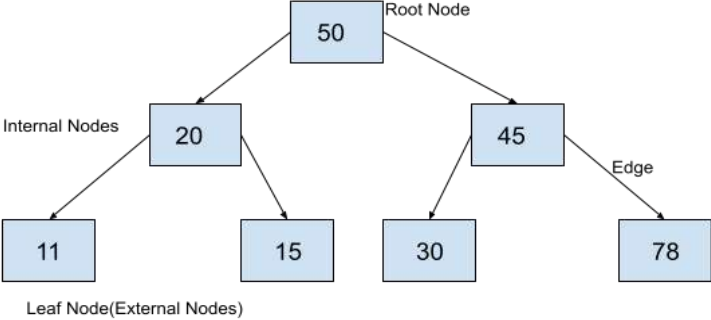
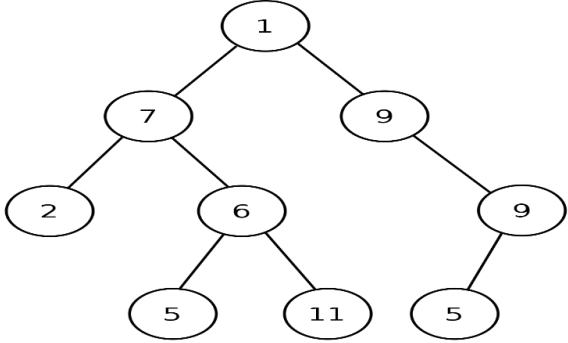
Q No.	UNIT-I	Marks	CO	BL
1	$F(n)=3n^2-n+4$ show that $f(n)=O(n^2)$	5	1	3
2	$F(n)=5n^2+10n$ demonstrate this to $\Omega()$ notation	5	1	3
3	$F(n)=\sqrt{n}$ and $g(n)=\log n$ , show that $f(n)+g(n)=O(\sqrt{n})$	5	1	3
4	Analyse the upper bound of running time of a linear function $f(n) = 3n^2 + 2n + 4$ ?	5	1	4
5	Analyse the lower bound of running time of a linear function $f(n) = 6n + 3$ ?	5	1	4
6	Show that $7n + 8 \in o(n^2)$ ?	5	1	3
7	Show that $4n + 6 \in \omega(1)$ ?	5	1	3
8	Analyze the concept of time complexity and space complexity. Write down best, average and worst case of all sorting techniques?	5	1	4
9	Differentiate between Big O, Big Theta notations?	5	1	4
10	Differentiate between Big Omega, Big Theta notations?	5	1	4
11	Write C programs for implementing Quick sort to arrange a list of integers in ascending order	5	1	3
12	Write C programs for implementing Merge sort to arrange a list of integers in ascending order	5	1	3
13	Apply insertion sort on the following elements 3, 1, 4,7,5,9,2,6,5,10	5	1	3
14	Apply the selection sort on the following elements 21,11,5,78,49, 54,72,88	5	1	3
15	Predict the result for arranging the following numbers using Quick sort procedure. 42, 12, 18, 98, 67, 83, 8, 10, 71	5	1	5
16	Produce the passes for the bubble sort algorithm for the following list of numbers. 90,77,60,99,55,88,66	5	1	6

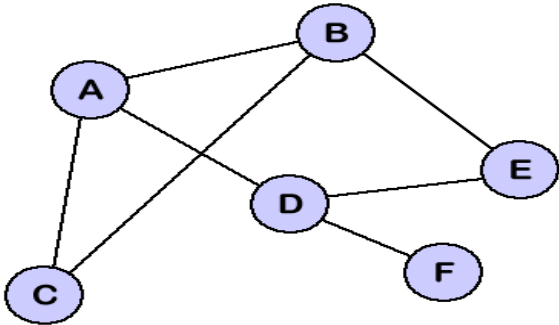
17	Apply radix sort on the following list of elements 45,37,05,09,06,11,18,27	5	1	3						
18	Explain about counting sort? Write a c program for Counting sort and Explain with an example?	5	1	4						
19	Produce the passes for the quick sort algorithm for the following list of numbers. 90,77,60,99,55,88,66	5	1	6						
20	summarize the role of space complexity and time complexity in measuring the performance of a program.	5	1	5						
Q No.	UNIT-II	Marks	CO	BL						
1	Convert the infix expression (a+b)-(c*d) into post fix form	5	2	3						
2	Explain the applications of Stacks	5	2	4						
3	Explain how to evaluate arithmetic expressions using stacks	5	2	4						
4	Construct a prefix expression for (i) (A-(B/C))*((D/K)-L) ii) X^Y/(5*Z)+2	5	2	6						
5	Construct a postfix expression for i) A-(B/C+(D%E*F)/G)*H ii) A+B*C-(D/E+F*G*H) using stack?	5	2	6						
6	Classify Data Structures? Can you list examples for each type of Data Structures	5	2	4						
7	Explain what happens when you add and/or delete an element to a stack and State an Algorithm for these operations	5	2	4						
8	Solve 7 2 3 + - 3 8 2 / + * 2 ^ 3 + using stack.	5	2	4						
9	Compare linear queue and circular queue? Write applications of queues	5	2	5						
10	Construct the functions for enqueue and dequeue on a Queue and What can you conclude from it	5	2	3						
11	Explain the applications of queues	5	2	4						
12	Explain priority queue and its operations	5	2	4						
13	Illustrate the ideas that justify the overflow and underflow situations of a Circular queue	5	2	3						
14	Estimate how a Circular Queue looks which has front=1 and rear=4 looks like below. NOTE:If Initial value of front=0 and rear=0 <table><tr><td></td><td>X</td><td>Y</td><td>Z</td><td></td><td></td></tr></table>		X	Y	Z			5	2	5
	X	Y	Z							

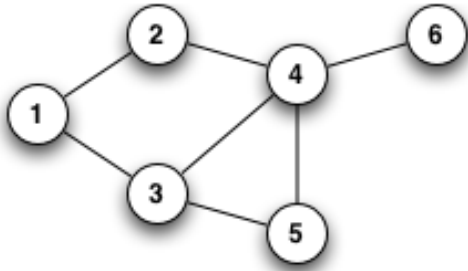
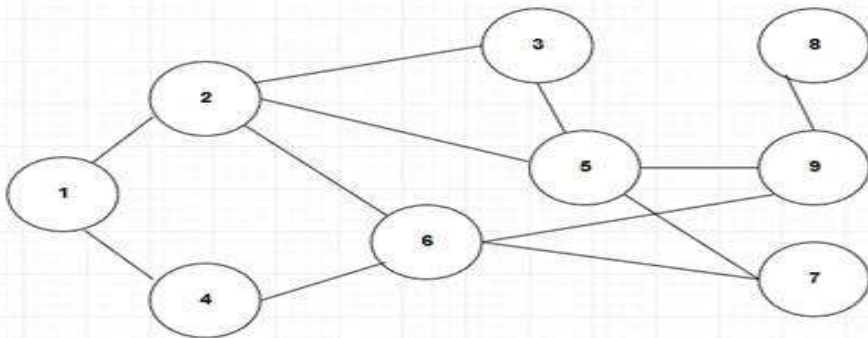
	(i)Add E,F (ii) Delete Two (iii) Add G,H (iv)Delete Four (v)Add I,J,K,L,M (vi) Delete one ?			
15	Construct an algorithm to find peek element in stack and algorithm to search an element in queue	5	2	3
16	Compare simple queue with circular queue	5	2	5
17	Assess the concept of priority queues	5	2	5
18	A circular queue has a size of 5 and has 3 elements 10,20 and 40 where F=2 and R=4. After inserting 50 and 60, what is the value of F and R. Trying to insert 30 at this stage what happens? Delete 2 elements from the queue and insert 70, 80 & 90. Predict the sequence of steps with necessary diagrams with the value of F & R.	5	2	5
19	Explain queue? Why it is known as FIFO? Write an algorithm to insert and delete an element from a simple queue	5	2	4
20	Assess the procedure to convert infix expression into postfix expression	5	2	5
Q No.	UNIT-III	Marks	CO	BL
1	Explain concatenation of singly linked lists	5	3	4
2	Analyse the code to insert an element in between two nodes in a double linked list	5	3	4
3	Explain how to create circular linked list and insert nodes at end	5	3	4
4	Create a C program that uses functions to perform the following: a) Create a singly linked list of integers. b) Delete a given integer from the above linked list. c) Display the contents of the above list after deletion.	5	3	6
5	Design a C program that uses functions to perform the following: a) Create a doubly linked list of integers. b) Delete a given integer from the above doubly linked list. c) Display the contents of the above list after deletion.	5	3	6
6	Analyse the given Singly linked list with each node containing either 0, 1 or 2. Write code to sort the list. Input: 1 -> 1 -> 2 -> 0 -> 2 -> 0 -> 1 -> 0 Output: 0 -> 0 -> 0 -> 1 -> 1 -> 1 -> 2 -> 2	5	3	4
7	Given a linked list and two integers M and N. Traverse the linked list such that you retain M nodes then delete next N nodes, continue the same until end of the linked list. Input: M = 2, N = 2 Linked List: 1->2->3->4->5->6->7->8 Output: Linked List: 1->2->5->6 The main part of the problem is ...	5	3	6
8	Compose a C code for Given two linked lists in a way such that the resultant must contain the elements alternatively from one list to other	5	3	6

	list. Input : LL1:1->2->3->4 LL2: 5-> 6->7 Output: 1->5->2->6->3->7->4			
9	Prepare a C program to remove duplicate vales from a double linked list	5	3	3
10	Compare and contrast SLL and arrays Can you list 5 applications of Single linked list?	5	3	5
11	Write a function for insert in Circular linked list and list any 3 applications for CLL	5	3	6
12	How would you apply what you learnt to develop a pseudocode for search an element in SLL	5	3	3
13	Illustrate possible function on Double linked list to delete a node and list any 4 applications for DLL	5	3	3
14	Explain about DMA. Explain all the functions with example program	5	3	4
15	Assess linked list. What are its applications? What are the types of linked list	5	3	5
16	Differentiate between arrays and linked list	5	3	4
17	Produce algorithm for insert and delete a node from doubly linked list	5	3	3
18	Explain the insertion operation in linked list. How nodes are inserted after a specified node	5	3	4
19	Point out the benefit and limitations of linked list	5	3	4
20	Explain the procedure to evaluate postfix expression	5	3	4
Q No.	UNIT-IV	Marks	CO	BL
1	Write inorder, preorder, post order traversal of the following tree  <pre> graph TD     8((8)) --&gt; 3((3))     8((8)) --&gt; 10((10))     3((3)) --&gt; 1((1))     3((3)) --&gt; 6((6))     6((6)) --&gt; 4((4))     6((6)) --&gt; 7((7))     10((10)) --&gt; 14((14))     14((14)) --&gt; 13((13)) </pre>	5	4	6

2	Create a binary search tree for the following numbers start from an empty binary search tree. 45,26,10,60,70,30,40 Delete keys 10,60 and 45 one after the other and show the trees at each stage	5	4	6
3	Construct an expression tree for the expression $(a + b * c) + ((d * e + 1) * g)$ . Give the outputs when you apply preorder, inorder and postorder traversals.	5	4	6
4	Predict binary tree for given In order traversal of a binary tree is D,G,B,E,A,H,F,I,C and pre order traversal is A,B,D,G,E,C,F,H,I	5	4	5
5	Evaluate the post order traversal for given In order traversal of a binary tree is E,A,C,K,F,H,D,B,G and pre order traversal is F,A,E,K,C,D,H,G,B	5	4	5
6	Sketch a C program that uses functions to perform the following: a) Create a binary search tree of characters. b) Traverse the above Binary search tree recursively in Post order.	5	4	3
7	Give an algorithm for constructing a binary search tree. While constructing the tree, take care that duplicate values are not added. Predict the algorithm on 2 ,5 , 9, 6, 12, 10, 13, 8	5	4	5
8	Analyse a binary search tree for the following 80, 40, 75, 30, 20, 90, 50	5	4	4
9	Analyse a binary search tree for the following 100, 50, 200, 25, 90, 80, 150	5	4	4
10	Point out the basic concepts of tree	5	4	4
11	Sketch the following binary search trees using array and linked list? 	5	4	3
12	Illustrate a function for insert and search Operations on a binary search tree	5	4	3
13	How would you construct a binary search tree from in-order and preorder traversals?	5	4	6
14	Sketch a Binary Search Tree whose preorder traversal is 38,14,8,23,18,56,45,82,70	5	4	3

15	 <p>Estimate the inorder, preorder and postorder of a given tree</p>	5	4	5
16	 <p>Estimate the inorder, preorder and postorder of a given tree</p>	5	4	5
17	 <p>Estimate the inorder, preorder and postorder of a given tree</p>	5	4	5
18	Analyse the concept of a binary tree and list its types and properties	5	4	4
19	Demonstrate tree traversals of a binary search tree? Outline algorithm.	5	4	3
20	Explain what is a binary search tree? How do you insert an element into a binary search tree	5	4	4

Q No.	UNIT-V	Marks	CO	BL
1	 <p>Predict BFS and DFS</p>	5	5	5
2	Explain the various applications of Depth First Search	5	5	4
3	Predict the advantages and disadvantages of various collision resolution strategies	5	5	5
4	Assess the result of inserting the keys 2,3,5,7,11,13,15,6,4 into an initially empty extendible hashing data structure with M=3.	5	5	5
5	Write a C program for Depth First Traversal in graphs	5	5	
6	Explain about Hashing. What is Hash Table?	5	5	4
7	Illustrate the concept of collision? What are collision resolution techniques?	5	5	3
8	Explain about different types of graphs with a neat diagram	5	5	4
9	Explain about Depth First Traversal in graphs with an algorithm and example.	5	5	
10	Write a C program for Breadth First Traversal in graph	5	5	6
11	Apply quadratic hashing to fill the hash table of size 11 elements 20,5,10,22,33,40,50,30,51,31	5	5	3
12	Analyze input (371, 323, 173, 199, 344, 679, 989) and hash function $h(x)=x \bmod 10$ , Show the result Separate Chaining, linear probing	5	5	4
13	Prepare the Hash table of size 11 by using quadratic probing to fill. Data elements are 23,0,52,61,78,33,100,8,90,10,14,	5	5	3
14	Prepare the steps for hash table entries for the given data set using linear probing 12,45,67,88,27,78,20,62,36,55 (size=10)	5	5	3
15	What are the two ways of representing the graphs? Explain it.	5	5	4
16	Explain about Breadth First Traversal in graphs with algorithm and an example.	5	5	4

17	Explain in detail about the types of hash functions.	5	5	4
18	Produce BFS on 	5	5	6
19	Produce DFS on 	5	5	6
20	Construct the resulting: a. Separate Chaining hash table b. Open addressing hash table using linear probing for the given input { 4371, 1323, 6173, 4199, 4344, 9679, 1989 } and a hash function of $h(X)=X \pmod{10}$	5	5	6

\*\*\*\*\*