

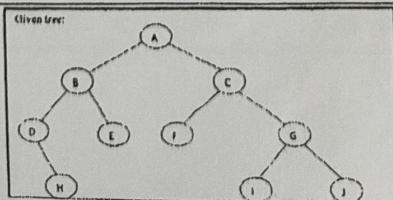
Bachelor of Technology (NEP) Nov-Dec -2024

Day & Date	Semester	Subject Name	Time	Code	Max Marks
Monday 16/12/2024	III (Fresh)	Data Structures (ENC)	02.30 p.m. to 04.30 p.m.	30701101	50

Q. 1 is Compulsory.

Solve any four questions from remaining questions.

Q.1	Answer the following (Any five)	10
a.	List out the areas in which data structures are applied extensively?	
b.	Draw Asymptotic Upper Bound and Lower Bound.	
c.	Translate infix expression into its equivalent post fix expression: $(A-B)*(D/E)$.	
d.	What are the different ways to represent tree data structure.	
e.	Explain time complexity for single task considering two algorithms.	
f.	What are binary trees? Mention different types of binary trees .	
g.	Define AVL trees	
Q.2		
a.	Describe how the following "infix" expression is evaluated with the help of the help of Stack : $5 * (6 + 2) - 12 / 4$	05
b.	Explain linked list data structure in detail.	05
Q.3		
a.	What is Stack? Why it is known as LIFO? Write algorithm of PUSH, POP, and PEEP operation on Stack.	05
b.	Explain Queue data structures and types of Queue data structure.	05
Q.4		
a.	Build an AVL tree with the following values{15,20,24,10,13,7,30,36,25,42,49}	05
b.	Write an algorithm to perform merge sort. Given the following list of numbers: [21, 1, 26, 45, 29, 28, 2] find the output obtained after each recursive call of merge sort algorithm.	05
Q.5		
a.	What is Binary Search Tree (BST)? Construct a BST for the following numbers: 47, 55, 23, 17, 39, 11, 50, 9, 19, 74, 33, 28 Show all the steps.	05
b.	Consider the following array A, and searching element X. how many comparison are required to search an element X in array. A= {25,45,87,21,18,49,13,115,83,65}	05
Q.6		
a.	Explain DFS algorithm in detail and illustrate using an example.	05
b.	Distinguish between linear search and Binary search.	05
Q.7		
a.	Sort following element using quick sort. Consider first element as pivot element. {65,70,75,80,85,60,55,50,45}	05
b.	Traverse the given tree using Inorder, Preorder and Postorder traversals.	05



Bachelor of Technology May-2025

Day & Date	Semester	Subject Name	Time	Code	Max Marks
Friday 09/05/2025	III	Data Structures (ENC)	11:00 am to 01:00 pm	30701101	50

Q. 1 is Compulsory.

Solve any four questions from remaining questions.

Q.1	Answer the following (Any five)		10
	a.	List out the areas in which data structures are applied extensively?	
	b.	Explain Big O notation with diagram.	
	c.	Translate infix expression into its equivalent post fix expression: $(A-B)*(D/E)$	
	d.	Distinguish quick sort and insertion sort	
	e.	What is a priority queue?	
	f.	What are binary trees? Mention different types of binary trees with example.	
	g.	Define space complexity. Explain space complexity for stack data structure.	
	h.	Define AVL-LL rotation.	
Q.2			05
	a.	Explain the prefix, postfix and infix expressions with an example.	05
	b.	Sort the sequence 3,1,4,1,5,9,2,6,5 using bubble sort and insertion sort.	
Q.3			05
	a.	What is Queue? Why it is known as FIFO? Write algorithm of Insert, Delete operation on Queue.	05
	b.	Explain linked list data structure.	
Q.4			05
	a.	Build an AVL tree with the following values. {15,20,24,10,13,7,30,36,25,42,49}	
	b.	Compare linear search and binary search data structure.	05
Q.5			05
	a.	Define the following terms: node, leaf node, ancestors, siblings of a node level of a node, degree of a node, degree of a tree, height and depth of a tree.	05
	b.	Draw the tree diagram by considering above terms. Properly mention every term on the tree.	05
Q.6			05
	a.	Explain DFS algorithm in detail and illustrate using an example.	05
	b.	Discuss following with reference to graphs. (i) Directed graph (ii) Undirected graph (iii) Degree of vertex (iv) Null graph (v)	05
Q.7			05
	a.	Distinguish Between B tree and B+tree.	
	b.	Construct a tree for the given inorder and postorder traversals. Inorder : DGBAHEICF Postorder : GDBHIEFCA	05