



# The National Institute of Engineering

B.E. 3<sup>rd</sup> Semester  
Autonomous Scheme

Computer Science & Engineering  
Subject: **Data Structures**

Subject Code: **CS3C01**  
Duration: 3 Hours

## MODEL QUESTION PAPER

**Note: Answer all the questions.**

CO	Bloom's Level	Question Number	Questions	Marks
CO1	L2	1.	a) What generic pointers in C. Demonstrate usage of generic pointers with an example program.	6
	L2		b) Illustrate the concept pointer to pointer in C with examples.	6
	L3		c) Write a program to do the following. i) Define a structure <i>Student</i> with fields <i>name</i> , <i>usn</i> and <i>cgpa</i> . ii) Create and initialize two variables of this structure. iii) Write a function to compared two structure variables passed to it and return the result appropriately. Call this function from main.	6
CO2	L2	2.	a) Write the algorithm for following operations in a singly linked list. i) Insertion in the beginning ii) Insertion after a node iii) Insertion at the end. iv) Deletion from start v) Deletion from the end.	10
	L3		b) Write a C Program to implement a doubly linked list which supports the two operations 'insertion in the beginning' and 'deletion at the end'. Demonstrate the operations in the doubly linked list in <i>main()</i> .	8
CO3	L2	3.	a) Describe polish notations and give examples.	6
	L3		b) Convert the given infix expression $a+((b/c*d-e)+f*g/h-i)+j$ to postfix expression step-by-step.	6
	L3		c) Implement a circular queue using array.	6
			<b>OR</b>	
	L3		d) Implement and demonstrate a simple stack using array.	6
	L2		e) Write the algorithm to convert an arithmetic expression in infix form to corresponding postfix form.	6
	L2		f) Write the algorithms for insert and delete operation on a circular queue that uses array.	6
CO4	L3	4.	a) Create the Expression tree for the expression $a+b/(c*d)-e*f$ and perform preorder and post order traversal.	9
	L3		b) Write an algorithm to delete a node from binary search tree	9
			<b>OR</b>	
	L1		c) List the applications of trees	9

	L3	d)	<p>Write the right threaded binary tree for the following binary tree.</p> <pre> graph TD     1((1)) --&gt; 2((2))     1((1)) --&gt; 3((3))     2((2)) --&gt; 4((4))     2((2)) --&gt; 5((5))     3((3)) --&gt; 6((6))     3((3)) --&gt; 7((7))     4((4)) --&gt; 8((8))     4((4)) --&gt; 9((9))     5((5)) --&gt; 10((10))     5((5)) --&gt; 11((11))     6((6)) --&gt; 13((13))     7((7)) --&gt; 14((14)) </pre>	9
CO5	L3	a)	Write an algorithm for radix sort and also sort the given numbers using the same technique. 345, 654, 123, 924, 472, 808, 911, 555	9
	L2	b)	<p>Explain the following hashing functions with example</p> <p>i) Mid square method</p> <p>ii) Folding method</p>	9
CO2	L2	a)	List and explain the two variants of header linked list.	2
CO3	L2	b)	Explain how insertion takes place in linked list representation of priority queue.	2
CO4	L3	c)	Construct an AVL tree by inserting the following elements in the given order. 63, 9, 19, 27, 18, 108, 99, 81.	3
CO5	L2	d)	Explain the advantage of using jump search with an example.	3