

11 MAR 2025 (M)

NCU/FRM/2.6/ACAD/027

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		Review Date:
	Question paper for Minor Test	
	School of Engineering & Technology	Session: Jan-June 2025
	Programme Name: BCA	Maximum Marks: 50
	Course Name: DATA STRUCTURES	Duration: 1.5hrs
	Course Code: BCL201	Sheet 1 of 2
	Semester: 4th Sem	
Note:		
1. All the questions are compulsory.		
2. Marks and COs are indicated against the questions.		
CO1: To understand the need for organizing data efficiently using various data structures		
CO2: To be able to implement and analyze the basic operations of arrays and linked lists		
CO3: To be able to implement and analyze the basic operations of stacks and queues		

SECTION A (15 marks)

Q. No.	Question	Marks	CO's
Q1.	Discuss the importance of Data Structures. Differentiate between linear and non-linear data structures	3	CO1
Q2.	Differentiate between worst-case, average-case and best-case running time complexities.	3	CO1
Q3.	Consider a 20 * 5 two-dimensional array marks which has its base address = 1000 and the size of an element = 2. Now compute the address of the element, marks[18][4] assuming that the elements are stored in row major order.	3	CO2
Q4.	Show the linked list and array representation of sparse matrices	3	CO2
Q5.	Evaluate the postfix expression 9 3 4 * 8 + 4 / -	3	CO3

SECTION B (25 marks)

Q6.	Consider an array A[]={0,1,2,3,4,5,6,7,8,9,10}. You have to search an element 5 in the above given array using linear and binary search techniques respectively. In each step, underline the items that is being search with the key value for each of the techniques.	7	CO2
Q7.	Show step-by-step procedure utilizing stack to convert the following infix expression to postfix notation: A-(B/C+(D%E*F)/G)*H	6	CO3
Q8.	Find the time complexity of the following codes and justify the same (a) class A { public static void main(String[] args) { int i, n = 8; for (i = 1; i <= n; i++) { System.out.printf("Hello!!!\n");	6	CO1

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	<pre> } } } (b) public class B{ public static void main (String []args){ int a=10, b=22; System.out.println("Before swapping Value of a is " + a + " and Value of b is " + b); a = (a + b) - (b = a); System.out.println("After Swapping Value of a is " + a + " and Value of b is " + b); } } </pre>		
Q9.	Write a program to perform the following operations on linked list: (a) Search an element in a singly linked list. (b) Create a singly linked list of n nodes and count the number of nodes	6	CO2
SECTION C (10 marks)			
Q10.	(a) Explain the significance of asymptotic notation in evaluating an algorithm's efficiency. Why is logarithmic complexity ($O(\log n)$) considered more efficient than linear complexity ($O(n)$)? (b) Write step by step procedure to implement stack using queue. (c) What condition indicates that a circular queue is full, and how is it different from an empty queue condition?	4	CO1
		3	CO3
		3	CO3

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