VIT
Vellore Institute of Technology

Slot : E1+TE1

School of Computer Science Engineering and Information Systems

Fall Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch : MCA

Course Name & code: PMCA501L Data Structures and Algorithms

Class Number (s): VL2023240106164, VL2023240106168, VL2023240106145

Faculty Name (s): Dr.Seetha.R, Dr. Mythili.N, Dr.Iyapparaja.M

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): ANSWER ALL THE QUESTIONS

Q.No.	Question	Max Marks
1.	Write a pseudo code to (i) create a Doubly Circular Linked List (3) (ii) count the number of nodes in it(3) (iii) print its element in reverse order(4)	10

2.	a. Derive the time complexity of the following algorithm using backward substitution and verify using Master's theorm (6)
	algorithm RecursiveSum(a, n)
	{if n <= 0 then
	return 0;
	else
	return RecursiveSum(a, n-1) + a[n];}
	
	b. Determine the time complexity of following codes (2+2)
	(1) int main()
	{cout << "Hello World";
	return 0;}
	
	(2) void fun(int n)
	{for (int i = 0; i <= n / 3; i++)
	for (int j = 1; j <= n; j = j + 4)
	cout << "Hello world";}
		10

3.	Using a divide and conquer search technique trace the steps for finding 30 and 1000 from the given set of following elements and write a recursive algorithm for it. **100 200 300 400 500 600 700 800 900 1000**	10
4.	a. Is Quick sort a stable sort? Justify (4) b. Using a non comparison sort, sort the following elements **1000, 110, 100, 111, 001, 1001, 011, 101, 010, 1010** (6)	10
5.	a. Derive the best case, average case and worst case time complexity of linear search with an example. (5) b. (i) Why do we analyse algorithms? (2.5) (ii) How do we measure its efficiency? (2.5)	10