IN-SEMESTER EXAMINATION-I

S.E. (Semester-III)

SUBJECT – DATA STRUCTURES AND ALGORITHM

Branch: IT **Date: 28/08/2024**
Div.: ALL **Timing: 2:00 PM to 3:00 PM**
Duration: 60 Minutes **Maximum Marks: 20**

Instructions –

1. All questions are compulsory.
2. Assume suitable data wherever necessary and state the assumptions made.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

ISE-1 2023,2023

Q.1		Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
	a.	What is the need of Data Structures?	2	1	AN
	b.	Define Data structure and list out all the linear and Non- Linear data structure	2	1	U

	c.	Write the time complexity of the following code. Explain step by step
		float sum(float list[ ], int n)
		{ float tempsum = 0;
		int i;
		for(i=0; i <n; i++)
		tempsum += list[i];
		return tempsum;}
			2	1	A

	d.	Write the time complexity and space complexity for Radix sort.	2	2	AN

	e.	Complete the below logic of insertion sort
		void insertion Sort(int a[], int n)
		{int i, j, temp;
		for (i = 1; i < n; i++) {
		temp = _____;
		j = i - 1;
		
		while(j>=0 && temp <= a[j])
		{
		_____ = _____;
		j = j-1;
		}
		_____ = temp;
		}
		}
			2	2	U

	f.	How is memory allocated for nodes in a linked list?	2	3	A
	g.	Write the structure declaration for a doubly linked list and explain each statement.	2	3	AN

IN-SEMESTER EXAMINATION-II

S.E. (Semester-III)

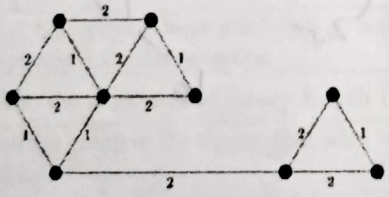
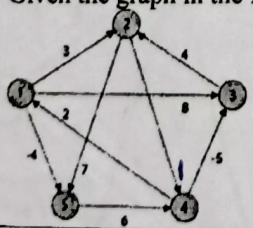
SUBJECT – DATA STRUCTURES AND ALGORITHM

Branch: IT
Div.: ALL
Duration: 60 Minutes

Date: 18/10/2024
Timing: 02:00 PM to 03:00 PM
Maximum Marks: 20

Instructions –

1. All questions are compulsory.
2. Assume suitable data wherever necessary and state the assumptions made.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

Q.1		Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
	a.	State the time complexity for all the operations in the queue data structure.	2	4	AN
	b.	Name the different notations used for representing arithmetic expressions.	2	4	A
	c.	State advantages of In-order Tree Traversal Technique	2	5	R
	d.	Organize below data to form Binary Tree and Binary Search Tree and list all leaf nodes 40,36,49,35,38,51,39	2	5	U
	e.	Explain the degree of the node in graph with example.	2	6	U
	f.	What is the number of distinct minimum spanning trees for the given weighted graph? Justify. 	2	6	A
	g.	Given the graph in the figure, find what is the adjacency matrix. 	2	6	A
Q.2	a.	State the applications of stacks and Queue Data Structure. Write the time complexity for following operations a. PUSH, b. POP, c. ENQUEUE, d. DEQUEUE	5	4	AN

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END SEMESTER EXAMINATION, DEC 2024 u 2 DEC 2024

S.E. SEMESTER III (CBCGS-HME 2023)

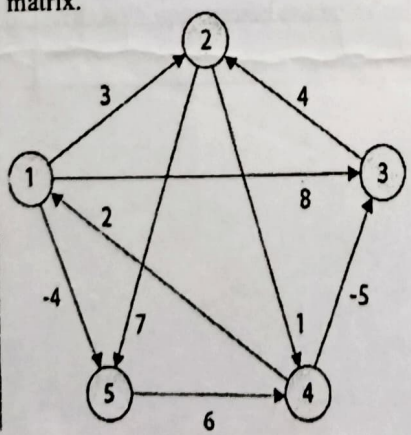
Branch:	**IT**	**Q.P. Code:**	**ED243ITR5S4-1**
Subject:	**Data Structures and Algorithm**	**Duration:**	**2 hours**
Subject Code:	**PCC-IT 301**	**Max. Marks:**	**60**

Instructions: **1. All sections are compulsory**
2. Figures to the right indicate full marks.
3. Assume suitable data if necessary and state the assumptions clearly.

Section-I **Short Answer Questions (Answer any 05 questions out of 06)** **(10 Marks)**
(Fundamental, Core Types)

Q. No.		Marks	CO	RBT Level	PI

1	Write the time complexity of the following code. Explain step by step
	float sum(float list[ ], int n)
	{
	float tempsum = 0;
	int i;
	for(i=0; i <n; i++)
	tempsum += list[i];
	return tempsum;
	}
		2	1	U	1.7.1

2	a) Write a C program to print the numbers, which are divisible by 5 in between 25 to 90. b) Discuss the time complexity of the above program step by step	2	2	U	2.5.3
3	Discribe linked list traversal. State the time complexity.	2	3	A	2.7.2
4	Enlist the operations on stack data structures and state the time complexity for each operation	2	4	A	2.8.2
5	Explain the properties of Binary Search Tree	2	5	R	2.6.5
6	Given the graph in the figure, find what is the adjacency matrix. 	2	6	R	4.2.1

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Autonomous College Affiliated to University of Mumbai
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Section-II	Descriptive Answer Questions(Answer any 04 out of 06) (Descriptive, Comprehension Types)				(20 Marks)
1	Explain recursion, and how does it differ from iteration in solving problems? Give an example code of recursion and iteration.	5	1	A	2.8.1
2	Explain Radix Sort Algorithm. Sort the following list using the Radix Sort Algorithm 329, 57, 839, 56, 720, 355, 657, 590	5	2	A	2.5.3
3	Write the structure declaration for a circular linked list and explain each statement.	5	3	A	2.7.2
4	Evaluate the following postfix expression 6 2 3 + - 3 8 2 / + * 2 ^ 3 + Show the steps	5	4	AN	2.7.2
5	State advantages of In-order Tree Traversal Technique	5	5	U	2.4.4
6	Write an algorithm to execute breadth first search.	5	6	R	3.2.3

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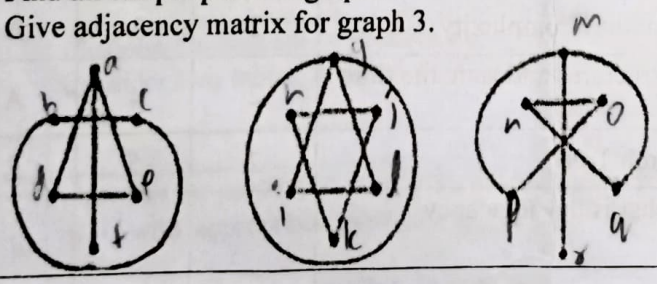
Section-III	Long Answer Question (Answer any 03 out of 05) (Application, Analytical, Evaluation, Design Type)				(30 Marks)
1	Write a C program to sort elements of an array using Radix Sort. State its time complexity.	10	2	A	2.4.4
2	How does a Linked List serve as an example of an Abstract Data Type (ADT), and what are the key characteristics that define it as such?	10	3	A	2.7.2
3	Write a menu driven program to implement Stacks using Arrays. Write the applications of Stack Data Structure.	10	4	A	2.7.2
4	Construct the Binary search tree for the following nodes and find all the tree traversal. 43, 56, 23, 12, 9, 66, 88, 34, 90, 21, 32,26	10	5	A	2.6.1
5	Justify which of the following is a connected, loop-free graph. Find the degree of each node. Find all simple paths in graph 2. Give adjacency matrix for graph 3. 	10	6	AN	3.1.1