U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: 3**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 22CS3PCDST **Max Marks: 100**
Course: Data Structures

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

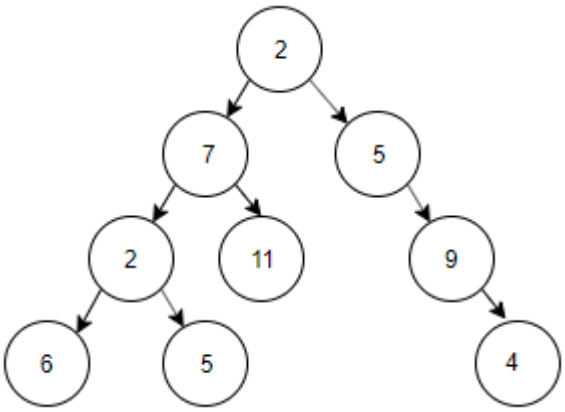
Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Differentiate between linear and non-linear data structure	CO2	PO2	4
	b)	Convert the following Infix expression to Postfix expression using Stacks: K + L - M*N + (O^P) * W/U/V * T + Q Show the contents of the stack at the end of each step. Also, write the pseudocode for the same.	CO3	PO3	10

	c)	Analyse the code given below and show the function call tracing for num=26.
		
		#include <stdio.h>
		int number (int, int);
		int main ()
		{
		int num, check;
		printf ("Enter a number: ");
		scanf ("%d", &num);
		check = number (num, num / 2);
		if (check == 1)
		{
		printf ("%d is a prime number\n", num);
		}
		else
		{
		printf ("%d is not a not number\n", num);
		}
		return 0;
		}
		int number (int num, int i)
		{
		if (i == 1)
		{
		return 1;
			CO2	PO2	6

			}
			else
			{
			if (num % i == 0)
			{
			return 0;
			}
			else
			{
			return number(num, i - 1);
			}
			}
			}			

			UNIT - II			
	2	a)	Write a C program that dynamically allocates memory for an array of integers. Allow the user to input the size of the array and elements and then print the array.	***CO3***	***PO3***	**6**
		b)	Demonstrate the operation of different types of double ended queue using arrays.	***CO3***	***PO3***	**10**
		c)	List the advantages and disadvantages of the structures.	***CO1***	***PO1***	**4**
			UNIT - III			
	3	a)	Implement a C program to create n node using single linked list and find the middle number of the linked list.	***CO3***	***PO3***	**10**
		b)	Write a C program to implement queue using stack.	***CO3***	***PO3***	**10**
			OR			
	4	a)	Demonstrate the working of circular linked list with all operations. List its advantages and disadvantages.	***CO3***	***PO3***	**10**
		b)	Write a C program to implement polynomial addition using linked list.	***CO3***	***PO3***	**10**
			UNIT – IV			
	5	a)	Write a C program to check if a Binary Tree is Binary Search Tree or not.	***CO3***	***PO3***	**10**

		b)	For the tree below, write the in-order,pre-order,post order traversal 	***CO2***	***PO2***	**6**
		c)	List the various applications of trees.	***CO1***	***PO1***	**4**
			OR			
	6	a)	Write a C program to implement deletion operations for all cases in the binary tree.	***CO3***	***PO3***	**10**
		b)	Show how a Binary Search Tree is created using the following elements in sequence. **47, 12, 75, 88, 90, 73, 57, 1, 85, 50, 62** Also, write a C function to create a Binary Search Tree.	***CO2***	***PO2***	**10**
			UNIT - V			
	7	a)	Using separate chaining construct the hash table with key size=6 for the following elements 22,45,36,78,88,167	***CO2***	***PO2***	**6**
		b)	Write a C program to implement hashing technique using linear probing.	***CO3***	***PO3***	**10**
		c)	Difference between separate chaining and open addressing.	***CO2***	***PO2***	**4**

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