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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E.

Semester: III

Branch: Information Science and Engineering

Duration: 3 hrs.

Course Code: 23IS3PCDSC

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.

UNIT - I			CO	PO	Marks
1	a)	Define Data Structure. With a neat diagram explain the classification of Data Structures.	CO1	PO1	08
	b)	Write a code snippet to illustrate searching for a particular node in the given singly linked list.	CO1	PO1	06
	c)	Consider a student linked list with USN as the key field to depict the following operations. - insert_Front() - insert_End()	CO1	PO2	06
OR					
2	a)	Define dynamic memory allocation. With an example outline the representation of dynamic array creation.	CO1	PO1	08
	b)	A college database has details of employees with employeeID as the info field. Write a code snippet to illustrate how to delete a specific node using singly linked list.	CO1	PO2	06
	c)	A departmental store has various items where customers can purchase items. Use ItemID to illustrate - deleteFront() - display()	CO1	PO2	06
UNIT - II					
3	a)	Write a code snippet to illustrate how to insert a node at the last and deleting a node from front using doubly linked list. The doubly linked list has names of group of friends “A”, “B”, “C”, “D”, “E”.	CO2	PO1	06
	b)	Implement a ‘C’ function to convert infix expression to its equivalent postfix expression.	CO2	PO1	05
	c)	Evaluate postfix expression for $E = 123 + * 321 - + *$. Show suitable stack traces.	CO2	PO2	05
	d)	Write a C function to show how push and pop operation will be done for a stack of plates piled up in a college food court.	CO2	PO2	04

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 - III					
4	a)	Write a C program to generate the Fibonacci Series using recursion.	<i>CO2</i>	<i>PO1</i>	05
	b)	Write a code snippet to demonstrate how insertion and deletion of elements can be done for a set of people standing to withdraw an amount at an Automated Teller Machine queue.	<i>CO2</i>	<i>PO2</i>	08
	c)	Write a C code to simulate the working of circular queue using an array to show insert, delete and display operations.	<i>CO2</i>	<i>PO2</i>	07
UNIT - IV					
5	a)	i) Define a binary tree with a tree depiction to mark Root, Internal Node, External Node, height, level and depth. ii) Illustrate a complete binary tree with a suitable example.	<i>CO2</i>	<i>PO1</i>	10
	b)	Write a program to demonstrate the working of Binary Search Tree Traversals.	<i>CO2</i>	<i>PO1</i>	10
OR					
6	a)	What is Threaded Binary Tree? How it is different from BST?	<i>CO2</i>	<i>PO1</i>	04
	b)	Construct a Binary Tree when the following Traversals are given: (i) Preorder: A B D I J C E K L M N P Inorder: I J D B C E A L N P M K (ii) Inorder: P N R V Q M S U T O Postorder: P V R Q N U T S O M	<i>CO2</i>	<i>PO2</i>	08
	c)	Write a function Create_BinaryTree() in a C program.	<i>CO2</i>	<i>PO2</i>	08
UNIT - V					
7	a)	What is AVL tree? Highlight the balance factor properties and rotations for an AVL tree.	<i>CO3</i>	<i>PO1</i>	10
	b)	What is Red Black tree? List and explain the properties of Red Black tree.	<i>CO3</i>	<i>PO1</i>	10
