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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**

Branch: Electronics & Telecommunication Engineering **Duration: 3 hrs.**

Course Code: 23ET3ESCDS **Max Marks: 100**

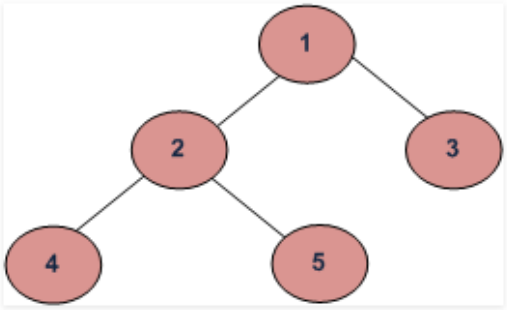
Course: C++ AND DATA STRUCTURES

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)	Define OOP. List the features of C++ and explain in brief.	CO1	-	**06**
	b)	Write a C++ program with function sum takes a constant integer array and a constant integer length as its arguments and adds up length elements in the array. It then returns the sum, and the program should print Sum	CO3	PO2	**06**
	c)	Wite a C++ program with class student with rollno, name and percentage as its data members and getdata() and printdata() as member functions	CO3	PO2	**08**
		OR			
2	a)	Differentiate between POP and OOP	CO1	-	**05**
	b)	Write a C++ program to find factorial of a number using recursive function	CO3	PO2	**05**
	c)	Define a class called array and illustrate the following operations that can be performed on an array object. Write the complete C++ program. i. input an array elements ii. print the array elements iii. mean of the array elements iv. find the largest value in an array v. sort the array elements in ascending order	CO3	PO2	**10**
		UNIT - II			
3	a)	Illustrate normal banking transactions such as deposit, withdrawal, balance and display. Use the constructor to construct initial value of an object acnt of class type account. Write complete C++ program	CO3	PO2	**10**

		b)	Create an array of class objects and initialize the data members of each array object and display them. Write complete C++ program.	*CO3*	*PO2*	**05**
		c)	Write a C++ program to demonstrate the use of a copy constructor	*CO3*	*PO2*	**05**
			OR			
	4	a)	Write a C++ program to add 2 complex numbers. Create class complex. Make use of the constructors with no argument, 1 argument and 2 arguments. Write a friend function to sum and display.	*CO3*	*PO2*	**10**
		b)	Write a C++ program to demonstrate binary operator overloading for + using friend function. Use a class called array and add integer value 2 to each element of the array object	*CO3*	*PO2*	**10**
			UNIT - III			
	5	a)	Describe visibility of inherited members with the help of a table	*CO1*	-	**06**
		b)	Demonstrate the concept of virtual base class with the help of a suitable C++ program	*CO3*	*PO2*	**08**
		c)	How do you create the pointers to objects? Describe with the help of a C++ program	*CO2*	*PO1*	**06**
			OR			
	6	a)	Describe class template with a suitable C++ program	*CO2*	*PO1*	**06**
		b)	Describe exception handling with respect to try block, catch block, throw and re throw. Write a C++ program to handle divide by zero error	*CO2*	*PO1*	**06**
		c)	Write a C++ program to demonstrate (i) multiple inheritance (ii) hybrid inheritance	*CO2*	*PO1*	**08**
			UNIT - IV			
	7	a)	Write a C++ functions to insert a node at any given position in a linked list	*CO3*	*PO2*	**06**
		b)	Write a C++ program with class stack. Member functions should be push( ), pop ( ), and display ( ). Use switch statement in the main function. Use an array for the implementation.	*CO3*	*PO2*	**10**
		c)	Describe any one application of stack	*CO1*	-	**04**
			OR			
	8	a)	Write a C++ functions to reverse the elements in a given linked list	*CO3*	*PO2*	**06**
		b)	Implement a queue using linked list to include the following operations i. insert an item from the rear end	*CO3*	*PO2*	**10**

			ii. delete an item from the front end iii. display the current status of queue			
		c)	Describe any one application of queue	*CO1*	-	**04**
			UNIT - V			
	9	a)	What is a skip list? Explain with an example	*CO1*	-	**05**
		b)	Implement a Hash table in C++ using linked list	*CO3*	*PO2*	**10**
		c)	Describe Heap sort algorithm with neat sketches for the following data {4,3,7,1,8,5}	*CO2*	*PO1*	**05**
			OR			
	10	a)	Implement Binary tree traversal mechanisms in C++	*CO3*	*PO2*	**10**
		b)	Write inorder, postorder and preorder sequences for the following binary tree 	*CO2*	*PO1*	**06**
		c)	Differentiate between array and linked list	*CO2*	*PO1*	**04**

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