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

Autonomous Institute Affiliated to VTU

June 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.

			UNIT - I	CO	PO	Marks
	1	a)	Differentiate between POP and OOP. List the features of OOP	CO1	-	**06**
		b)	Write a C++ program to include two different classes with a data member each. Write a common friend function to both classes which does swapping of data members. Include main program.	CO3	PO2	**08**
		c)	Write a C++ program with a class called ITEM. The data members could be item number and item code. Write two member functions to get the data and print the data. Create an object belonging to class ITEM and access the member functions in main program.	CO3	PO2	**06**
			OR			
	2	a)	What are the different layers present in computer software? Draw a suitable block diagram	CO1	-	**05**
		b)	Write a C++ program to find GCD of two numbers 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. average of the array elements iv. find the largest value in an array	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**

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.

				CO3	PO2	**10**
	b)	Write a C++ program to demonstrate the following (i) Member wise initialization (ii) Member wise assignment				
		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 the following (i) Unary operator overloading (ii) Binary operator overloading		CO3	PO2	**10**
		UNIT - III				
5	a)	With neat block diagrams show the different architectures involved in inheritance		CO1	-	**10**
	b)	Write a C++ program to show the Hierarchical inheritance model for a base class called BOOKS and derived classes SCIENCE BOOK and COMMERCE BOOK. Assume suitable data and function members to each of the classes. Show the main program		CO3	PO2	**10**
		OR				
6	a)	Describe the following with suitable C++ program (i) Class template (ii) Function template		CO2	PO1	**10**
	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	**10**
		UNIT - IV				
7	a)	Write a C++ function to reverse the elements in a linked list		CO3	PO2	**05**
	b)	Write a C++ program with class QUEUE. Member functions should be INSERT( ), DELETE ( ), and DISPLAY ( ). Use switch statement in the main function. Use an array for the implementation.		CO3	PO2	**10**
	c)	What is postfix expression calculator? Explain with an example.		CO1	-	**05**
		OR				
8	a)	Write a C++ functions to sort the elements in a given linked list		CO3	PO2	**06**

	b)	Implement a STACK using linked list to include the following operations
		   i. PUSH( )
		   ii. POP( )
		   iii. DISPLAY( )
				CO3	PO2	**10**

		c)	Describe any one application of queue	CO1	-	**04**
			UNIT - V			
	9	a)	What is a hash function and hash table? Explain with an example C++ program	CO1	-	**10**
		b)	Implement a Binary tree in C++ using linked list	CO3	PO2	**10**
			OR			
	10	a)	What is a Heap? Describe Heap sort algorithm with an example sequence. Show all intermediate steps with suitable diagrams	CO3	PO2	**10**
		b)	Write inorder, postorder and preorder sequences for the following binary tree	CO2	PO1	**06**
		c)	Give the computational complexity of search operation in the following (i) linked list (ii) Binary search (iii) Skip list (iv)Hash table	CO2	PO1	**04**

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