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

Autonomous Institute Affiliated to VTU

June / July 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**

Branch: EIE / EEE **Duration: 3 hrs.**

Course Code: 23EI5PE1CD / 23EE5PE1CD / 22EI5PE1CD **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.
3. Output to be mentioned wherever applicable

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.

		MODULE - I	*CO*	*PO*	Marks
1	a)	Explain the concept of polymorphism and Inheritance in OOP language.	*CO1*	*PO1*	**08**
	b)	What are manipulators in C++? How are they used to format output in C++ programs?	*CO1*	*PO1*	**05**
	c)	Develop a C++ program that accepts an array as input to a function, performs an operation on the array within the function and returns a value from the function based on the array operation.	*CO2*	*PO2 PO3*	**07**
		OR			
2	a)	Utilize the concept of pass by reference and pass by pointers to develop a C++ program that swaps the contents of two variables. Summarize the execution of the program.	*CO2*	*PO2 PO3*	**07**
	b)	Summarize the key distinctions between the storage classes	*CO1*	*PO1*	**07**
	c)	Define Object-Oriented Programming (OOP)? Compare the fundamental approaches of Procedural Oriented Programming (POP) and OOP.	*CO1*	*PO1*	**06**
		MODULE - II			
3	a)	Write a C++ program illustrating the use of friend functions to access private data in multiple classes.	*CO3*	*PO2 PO3*	**07**
	b)	Explain the concept of multiple constructors and destructors using a C++ code.	*CO3*	*PO2 PO3*	**07**
	c)	Explain the characteristics of constructors.	*CO1*	*PO1*	**06**
		OR			
4	a)	Develop a C++ program that showcases a copy constructor for a class representing a student, copying their name and ID	*CO3*	*PO2 PO3*	**08**

		b)	Develop a C++ program that demonstrates the concept of unary operator overloading. Explain the program's execution flow.	*CO3*	*PO2 PO3*	**07**
		c)	Discuss the rules for overloading of operators	*CO1*	*PO1*	**05**
			MODULE - III			
	5	a)	Illustrate the different types of inheritance with suitable diagrams and syntax.	*CO1*	*PO1*	**09**
		b)	Write a C++ code example demonstrating the use of virtual functions to achieve dynamic polymorphism and summarize the execution of the program.	*CO3*	*PO2 PO3*	**06**
		c)	Describe the role of the 'this' pointer in accessing class members using a C++ code	*CO3*	*PO2 PO3*	**05**
			OR			
	6	a)	Develop a suitable C++ program to illustrate use of array of pointers to objects in OOP using suitable program.	*CO3*	*PO2 PO3*	**06**
		b)	Develop a C++ Code to implement Push and Pop operation on a stack class using class template.	*CO3*	*PO2 PO3*	**08**
		c)	Suggest a C++ to illustrate function templates with multiple parameters in C++ programming.	*CO3*	*PO2 PO3*	**06**
			MODULE - IV			
	7	a)	Enumerate the various operations performed on Data Structures and explain any one operation.	*CO1*	*PO1*	**05**
		b)	Suggest a suitable C++ program to insert and delete an element in an array and justify with an example.	*CO4*	*PO2 PO3*	**10**
		c)	Explain the key distinctions between Linear and Non-Linear Data Structures.	*CO1*	*PO1*	**05**
			OR			
	8	a)	Describe the purpose of file stream classes in C++	*CO1*	*PO1*	**08**
		b)	Develop a suitable algorithm to insert and delete first node in a singly linked list and summarize the execution of the program.	*CO4*	*PO2 PO3*	**12**
			MODULE - V			
	9	a)	Propose a suitable C++ code to perform basic operations on linked list implementation of stacks and justify the same with suitable diagrams	*CO4*	*PO2 PO3*	**10**
		b)	Develop an appropriate algorithm to perform basic operations on Queues and Justify the procedure with an example.	*CO4*	*PO2 PO3*	**10**
			OR			
	10	a)	Develop a C++ program to perform binary tree traversals	*CO4*	*PO2 PO3*	**12**
		b)	Write a suitable algorithm for inorder and preorder traversals.	*CO4*	*PO2 PO3*	**08**

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