



Continuous Assessment Test (CAT) – II MAR 2026

Programme	:	B.Tech CSE	Semester	:	Winter Semester 2025-26
Course Code & Course Title	:	BACSE104 & Structured and Object-Oriented Programming	Class Number	:	CH2025260501289 CH2025260501301 CH2025260501512 CH2025260501518 CH2025260501661 CH2025260501947 CH2025260501959 CH2025260501969 CH2025260502397 CH2025260502400 CH2025260502404 CH2025260502407 CH2025260502411
Faculty	:	53368 LOGESWARI G 53392 JOHNSI R 53608 BENILA S 52866 PANKAJA LAKSHMI P 53112 KARTHIKEYAN N 54527 RAJKUMAR R 51679 GANALA SANTOSHI 53691 JEYAVIM SHERIN R C 53619 MANIKANDAN P 53638 OMANA J 54151 AARTHI B 53694 PRETHIJA G 52836 VALLIDEVI K	Slot	:	A1
Duration	:	90 Minutes	Max. Mark	:	50
General Instructions: < Use this space to provide additional information such as graph sheet, data book etc.>					
• Write only your registration number on the question paper in the box provided and do not write other information • Use statistical tables supplied from the exam cell as necessary • Use graph sheets supplied from the exam cell as necessary • Only non-programmable calculator without storage is permitted					
Answer all questions					
Q. No	Sub Sec.	Description	Marks	CO	BT Level
		An e-commerce platform stores order information with the following details: • Customer details • Product details • Payment details			

1	Each order contains multiple products. Design a program with: Structure Customer • CustomerID • Name • Phone Structure Product • ProductID • ProductName • Price • Quantity Structure Order • OrderID • Customer (nested structure) • Array of Products • TotalBill Write a C program using nested structures to read the data and to perform the following : 1. Calculate the total bill for each CustomerID (2 marks) 2. Display customer ID, for all the orders where bill > ₹10,000 (2 marks) 3. Show the ProductID of most expensive product purchased by the CustomerID with OrderID. (3 marks) 4. Explain why nested structures are appropriate for this design. (3 marks)	10	2	K3
2	A banking software company is developing a secure system to manage customer accounts. The system contains a class Account that stores private information such as account number and balance. For security reasons, these details should not be accessed directly by other classes. However, the Audit Department needs special access to verify account balances during financial audits, and a Transaction function must update the balance after performing special operations. To achieve this, the developers decide to use friend functions and friend classes. Design a C++ program to implement the above banking system. 1. Create a class Account with appropriate access specifiers for the following data members: (2 marks) ◦ accountNumber ◦ balance 2. Declare: (2 marks)	10	4	K3

		- o A friend function performTransaction() that modifies the account balance. - o A friend class Auditor that can access and display the account details for auditing purposes. 3. Implement the following: (3 marks) - o performTransaction() should update the balance based on a deposit amount. - o Auditor class should contain a method auditAccount() to display the account number and balance. 4. Evaluate how using friend function and friend class helps in controlled access to private data while maintaining security. (3 marks)			
3		A smart home automation company is developing software to manage different types of devices in a house. The company has a base class called Device that stores common information such as the device name and ID. Two derived classes, SmartLight and SmartThermostat, inherit from the Device class. When a device is added to the system, its constructor should initialize the device details. When the device is removed or the program ends, the destructor should release resources and display a message indicating that the device has been safely removed. The company wants to evaluate how constructors and destructors are invoked in inheritance, especially the order of execution when objects of derived classes are created and destroyed. Create a base class Device with: (2 marks) Data members: • deviceName and deviceID • A constructor that initializes these values and prints a message when a device is created. • A destructor that prints a message when the device is removed. Create two derived classes: (2 marks) • SmartLight • SmartThermostat • Each derived class should have its own constructor and destructor displaying appropriate messages. In the main() function: (6 marks) • Create objects for SmartLight and SmartThermostat. • Observe the order in which constructors and destructors are executed. • Evaluate the sequence of constructor and destructor calls in the inheritance hierarchy and explain why this order occurs.	10	4	K3
4		An online learning platform tracks how many students enroll in a particular course. Each student object stores the student name and course name, while the total number of enrolled students must be shared among all objects.			K3

- Write a class named Student containing the data members studentName, courseName, and a static data member totalStudents that stores the total number of students enrolled in the course. Implement a constructor that initializes the student name and course name and increments totalStudents whenever a new student object is created. Also implement a static member function getTotalStudents() to return the total number of enrolled students. (5 Marks)
- Define an inline member function displayStudent() that displays the student name and course name. Write a program that creates at least three Student objects, displays each student's details using the inline function, and finally displays the total number of enrolled students using the static member function. (5 Marks)

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Write a C++ program to manage the details of N employees in a company. Create a class Employee with the following private data members:

- empId
- name
- department
- salary

Implement the following member functions:

- A constructor to initialize all data members.
- displayDetails() const – displays the employee details.
- Appropriate functions where required.

In the main() function, create an array of Employee objects and initialize them using the constructor. Then write logic and code in main() to:

1. Calculate the average salary of all employees. (3 marks)
2. Display the details of employees whose salary is greater than the average salary. (3 marks)
3. Use the displayDetails() function to print the employee information. (4 marks)

10

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K3

*****All the best *****