



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.: 25BCE2714

SLOT: D2

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING CONTINUOUS ASSESSMENT TEST - II WINTER SEMESTER 2025-2026

Programme Name & Branch : B.Tech. Core CSE and its Specialization
Course Code and Course Name. : BACSE104 & Structured and Object-Oriented Programming
Faculty Name(s) : Gladys Gnana Kiruba B, Dhivyaa C R, Rajarajan G, Narayanan Prasanth,
Geraldine Bessie Amali D, Kalaivani K, Saritha Murali, Sunil Kumar, Sekarapandian N, Gunasekar M, Vimala Devi K,
Naga Raja G, Ramesh Babu Vemuluri, Swetha V, Goutam Majumder
Class Number(s): VL2025260501453,1465,1455,1433,1444,1459,1493,1462,1451,1479,1435,1437,1440,2341,1482
Date of Examination : 18-03-2026
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- CO2 - To apply modular programming techniques by utilizing functions, structures, and files for efficient problem-solving in real-world applications; CO3 - To apply pointers and dynamic memory allocation techniques to manage data efficiently in C/C++ programs; CO4 - To demonstrate object-oriented principles (encapsulation, inheritance, and polymorphism) to design structured and scalable applications.

QNo	Questions	M	CO	BL
1.	Write a C program to manage machine maintenance records in a factory. Define a structure <i>machine</i> with members <i>machineID</i> , <i>machineName</i> , <i>serviceType</i> (1 for Repair and 2 for Inspection), and <i>serviceData</i> that stores either the <i>repairCost</i> (float) if the machine underwent repair or the <i>inspectionHours</i> (int) if it underwent inspection. The program should accept details of 5 machines, store the appropriate data based on the service type, and display all machine details accordingly. Finally, compute and display the total repair cost of all repaired machines. Note: Use appropriate construct so that <i>serviceData</i> can hold only one of the values at a time.	10	2	3
2.	A retail company wants to maintain the stock quantities of 100 products in a binary file named <i>inventory.dat</i> . Each product is identified by a Product ID (1 to 100), and the stock quantity. The system should allow direct updating of a product's quantity without reading the entire file. Write a C program to perform the following: a) Create and open the binary file <i>inventory.dat</i> for reading and writing. b) Initialize the file to store 100 integers, all set to 0, representing empty stock. c) Enter stock quantities for any 10 products. Use <i>fseek()</i> to store each quantity at the location in the file corresponding to (ProductID - 1). d) Analyze how random access using <i>fseek()</i> improves efficiency compared with sequential file updates in large inventory systems.	10	2	3
3.	A Merchandise Management System for a retail company is designed using three C++ classes. The <i>Product</i> class stores product ID, product name, and base price. The <i>Inventory</i> class maintains the quantity available for each product. The quantity data member is declared as private. The <i>SalesRecord</i> class calculates the total revenue generated, based on the number of units sold and the product price. The system should also provide a mechanism to compare the stock quantities of two products. a) Explain why a friend function is required to compare the stock quantities of two products in this system. b) Write the C++ class definitions for <i>Product</i> , <i>Inventory</i> , and <i>SalesRecord</i> , clearly indicating the appropriate data members and member functions. c) Implement a friend function that compares the stock quantities of two <i>Inventory</i> objects and displays which product has greater stock. Note: Provide only the relevant C++ code snippets and proper justification where necessary.	10	3	3



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4.	A) Consider the 4 ways of creating C++ objects: (i) globally, (ii) locally as static, (iii) locally as non-static, and (iv) const object. With appropriate examples, compare these 4 types of objects based on the order of constructor and destructor invocations, lifetime, and scope. B) Rewrite the following C++ program after correcting all the errors. Do not modify the existing access specifiers or introduce new member functions. <pre>#include <iostream> using namespace std; class Student { int rollNo; public: static int count; Student(int rollNo) { rollNo = rollNo; count++; } void display() { cout << rollNo << endl; } }; int main() { Student s1; s1.rollNo = 101; s1.display(); cout<<count; return 0; }</pre>	(6+4)	3	4
5.	A healthcare information system integrates medical records and insurance claim processing as demonstrated in the diagram. Analyze the multiple inheritance and identify which data members of MedicalRecord and Insurance can be directly accessed within the SpecialistDoctor class. Justify your answer. Write the C++ class definitions. Implement the member functions in SpecialistDoctor such that approveTreatment() prints the treatmentPlan obtained from the MedicalRecord class, and processClaim() prints the claimAmount obtained from the Insurance class. Explain how multiple inheritance improves modularity and reusability in this healthcare system. MedicalRecord private: int patientID protected: string treatmentPlan public: void getMedicalSummary() Insurance private: int policyNumber double claimAmount public: string providerName protected: double getClaimAmount() public: void getInsuranceDetails() void setClaimAmount(double amt) SpecialistDoctor private: string specialization public: void approveTreatment() void processClaim() Public inheritance Protected inheritance	10	4	4
