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

Continuous Assessment Test (CAT) – II - MAR 2025

Programme	:	B.Tech CSE	Semester	:	Winter 2024-25
Course Code & Course Title	:	BCSE102L – Structured and Object-Oriented Programming	Slot	:	E1
Faculty	:	Dr. NITHYANANDAM P Dr. HEMALATHA K Dr. ELAKIYA E Dr. VALARMATHI SUDHAKAR Dr. JEIPRATHA P N Dr. OMANA J Dr. REVATHI A R Dr. SUBBULAKSHMI T Dr. K UMA MAHESWARI Dr.SUDHA C	Class Number	:	CH2024250501540 CH2024250501541 CH2024250501542 CH2024250501543 CH2024250501544 CH2024250501545 CH2024250501546 CH2024250501547 CH2024250501548 CH2024250501549
Duration	:	90 Minutes	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided, and do not write other information.
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		Write a C program to analyze stock trading transactions for 10 persons over a month using **only unions** (no structures). Each person performs multiple trades, which include the **stock name quantity, price per share, and trade type (Buy/Sell).** The program should: i. Store trade details using **unions.** (4 Marks) ii. Calculate and print the **total buy and sell values** for each person with the description of he bought / sold more in that month. (5 Marks) iii. The **persons who bought the most stocks and, sold the most stocks with equal buy and sell values.** (6 Marks) The trade details should be **predefined** in the program (no user input required).	15
2		Design an Inventory Management System using C++ classes and objects. Each product should have attributes: Product Name, Product ID (6-digit), Price, and Quantity in Stock. Use a constructor to initialize product details and a static member variable to track the total number of products. Provide functions for restocking and selling products, using a this pointer to update stock levels. Implement an inline function to display product details.	15

		The program should allow searching for products by Product ID or Name and should display the most expensive product and products with low stock (quantity < 10). Use an array of objects to manage multiple products. (constructor – 3 Marks; static member – 3 Marks; this pointer – 3 Marks; inline function – 3 Marks; an array of Objects – 3 Marks)	
3		Arjun is developing an AI chatbot that analyzes user messages to detect specific commands such as "weather", "news", and "joke". However, the chatbot must ensure that the message content remains private, meaning that a **friend function** must be used to access and analyze the text to extract intent. Write a **C++ program** that includes the following requirements: i. **Define a Message class** that: • Contains a **private attribute** text that stores a user message as a string. • Has a **constructor** that initializes the text attribute. • Declares a **friend function** analyzeMessage(Message&) to access the private text attribute. (2 Marks) ii. **Implement the friend function Analyze message(Message&),** which: • Searches the text attribute for specific keywords: o "weather" o "news" o "joke" • Performs **case-insensitive** keyword detection. (3 Marks) iii. **Prints a response based on the detected command as follows:** (4 Marks) • If weather "Getting the latest weather" • If news "Getting the latest news" • If joke "latest joke" • Default "No command detected" iv. **Demonstrate the functionality** by creating multiple Message objects with different text inputs and calling Analyz Message (Message&) on each. (1 Mark) **<u>Sample Test Cases and Expected Output</u>** ***Input 1:*** Tell me the weather forecast ***Output 1:*** Getting the latest weather ***Input 2:*** Tell the news ***Output 2:*** *Getting the latest news* ***Input 3:*** Tell me a joke ***Output 3:***	10

		latest joke ***Input 4:*** Just a normal conversation ***Output 4:*** No command detected.	
4		In a multilevel hierarchy of automobile scenarios, Maruthi is a class that is inherited from the **Car** class, which is inherited from the base class, **Vehicle**. Baleno, Swift, and Alto are the derived classes of Maruthi. The data members and member functions present in the classes are private and public, respectively. • Vehicle class has fuel_type and wheels as data members and Vehicle(), Show_Details()as member function • Car class has doors as data member and Car(),Show_Cardetails() as member function • Maruthi class brand_name as data member and Maruthi(),Show_Brand()as member function • Baleno has Baleno(), Show_Model as member function • Swift has Swift(), Show_Model as member function • Alto has Alto() Show_Model as member function i. Draw a neat sketch depicting the above multilevel hierarchical inheritance (2 Marks) ii. Create an appropriate constructor in each class to initialize the data member (2 Marks) iii. Create an appropriate member function to display the respective data member (4 Marks) iv. Creates objects of Baleno, Shift and Alto class in the main program, constructs the object using constructors and display the complete details of every object. (2 Marks)	10

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