

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

REG.NO.:

SLOT: E1

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

Programme Name & Branch : B.Tech, Computer Science and Engineering and Business Systems

Course Code and Course Name : CBS1005, Software Engineering Methodologies

Faculty Name(s) : Prof. Adrija Bhattacharya

Class Number(s) : VL2025260103268

Date of Examination : October 9, 2025

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)
 - Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
3. Specify the business requirements through appropriate system analysis and design.
5. Implement and demonstrate any business system software from specification to validation and verification.

Q. No	Question	Module	Marks	CO	BL
1.	Consider an online banking login system where a user is allowed up to three login attempts before the account is blocked. The system responds differently based on whether the user enters correct or incorrect credentials at each attempt. (a) Construct a state transition table to represent the states and transitions during the login attempts, indicating states such as 1st attempt, 2nd attempt, 3rd attempt, access granted, and account blocked. [4] (b) Develop an event table that lists the user actions/events and corresponding system responses for this login process. [4] (c) Explain how using these tables can help identify missing transitions and improve system testing and design. [2]	4	10	3	3
2.	In a student information management (SIM) system, there is a single module that handles multiple responsibilities including storing student details, calculating grades, printing transcripts, and sending email notifications. (a) Identify any four coupling design mantra for the scenario of SIM. [5] (b) Suggest how you would refactor the system to improve cohesion and reduce coupling. How does this refactoring help in maintainability and extensibility in the given SIM scenario. [5]	5	10	3	4
3.	a) Draw a UML class diagram for a Library Management System. The system manages books, library members, and borrowing transactions. Include the following details: i. A class for Book with attributes like ISBN, title, author, and availability status.	5	6	3	3



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	ii. A class for Member with attributes such as member ID, name, and contact details. iii. A class for BorrowTransaction that records book borrowing, including borrow date and return date. iv. Relationships: Members can borrow multiple books; each borrow transaction is associated with one member and one book. v. Include relevant methods like borrowBook() and returnBook() in appropriate classes. b) Design the data flow architecture using suitable notations for the given scenario in 4.a)		4		
4.	a) Critically comment on "Building the right product and Building the product right are the same thing." Explain briefly with examples. b) You are working as a software tester in a team developing an online banking application. The application has modules for user login, fund transfer, transaction history, and bill payments. During testing of the fund transfer module, the following observations are noted: The system allows transferring funds to invalid account numbers without validation. When transferring a large amount, the system response is very slow, affecting user experience. Some users report discrepancies when viewing recent transactions after multiple fund transfers. The login page allows only 3 incorrect password attempts before locking the user out. There is no automated test suite to verify core functionalities after new updates. i) In the above banking system, a user can transfer funds between ₹100 and ₹10,000 in a single transaction. Any amount below ₹100 or above ₹10,000 should be rejected by the system. Prepare a Boundary Value Analysis test suitable for this. Provide at least four test cases in a table. [4] ii) Suggest solution to incorporate testing for volume, performance, and efficiency based on the scenario observations. [3]	5	3	5	2
		5	7		
5.	Consider the following C program <pre>int main() { int n, index; printf("Enter a number: "); scanf("%d", &n); index = 2; while (index <= n - 1) { if (n % index == 0) { printf("It is not a prime number\n"); break; } index++; } if (index == n) printf("It is a prime number\n"); }</pre> a) Draw the Control Flow Graph (CFG) for the above program. [3] b) Calculate the Cyclomatic Complexity of the program and list the independent paths. [3] d) Design test cases based on the independent paths identified. (at least one for each path).[4]	6	10	5	5
