



# VIT<sup>®</sup>

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

Reg. No

## Final Assessment Test(FAT) - Apr/May 2025

Programme	M.C.A.	Semester	Winter Semester 2024-25
Course Code	PMCA603L	Faculty Name	Prof. Christy Jackson J
Course Title	Mobile Application Design and Development	Slot	C1
		Class Nbr	CH2024250501742
Time	3 hours	Max. Marks	100

### Instructions To Candidates

- Write only your registration number in the designated box on the question paper. Writing anything elsewhere on the question paper will be considered a violation.

### Course Outcomes

- CO1: Understand the working principles of mobile applications  
CO2: Implement interactive user interfaces that work across a wide range of devices  
CO3: Create, test and debug mobile application by setting up a development environment  
CO4: Formulate methods for storing and retrieving data in mobile applications

### Answer all Questions (10 × 10 Marks)

01. Design a Flutter function that calculates a user's age category (Child: 0-12, Teen: 13-19, Adult: 20-59, Senior: 60+) based on their birth year input. Analyze how different control statements (if-else, switch) could optimize this logic and justify your choice. [10] (CO1/K4)
02. Create a Dart class hierarchy for a mobile app's user roles (e.g., Admin, User, Guest) using polymorphism. Encapsulate sensitive data like user ID and password, and demonstrate how a single method (e.g., displayRole()) behaves differently for each role. You may declare values for variables wherever needed.

### Sample Output

Admin: Full Access (ID: ADM001)  
User: Limited Access (ID: USR001)  
Guest: View Only (ID: GST001)

[10] (CO2/K2)

03. Design a reusable GradientButton widget in Flutter with a customizable gradient color scheme. Explain how this widget could be extended to support additional styling options like border radius, shadow, or text style. [10] (CO4/K5)
04. Synthesize a Flutter widget that allows users to add images from their device gallery and apply custom styles (e.g., border, shadow, or color filter) to the displayed images. Design a solution that includes an image picker and a styled image preview, and explain how your styling choices enhance the visual appeal of the app. [10] (CO3/K3)
05. Analyze how the Card widget can be used to improve the readability of content in a Flutter app. Design a Card-based layout for a product listing (e.g., name, price, image) and explain its visual hierarchy. [10] (CO1/K1)
06. Synthesize a Dart solution to manage a shopping cart using a Map for product details (ID, name, price) and a List for cart items. Implement getters to calculate the total price and item count dynamically. [10] (CO1/K3)
07. Evaluate the role of TextEditingController in handling user input validation in a Flutter form. Design a form with two TextField widgets: one for email input and one for password input, both providing real-time validation feedback using controllers. For email, validate the presence of an "@" symbol; for password, ensure it is at least 6 characters long. [10] (CO2/K3)
08. Synthesize a Flutter navigation system with named routes for a multi-screen app (Home, Profile, Settings). Implement a solution that passes user data (e.g., username) between screens using route arguments. [10] (CO3/K1)



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[10] (CO3/K1)

09. Synthesize a Flutter solution to manage a task list using Firebase Realtime Database. Design a system to add new tasks and display the list in real time, ensuring data synchronization across devices. Explain how Firebase's real-time capabilities benefit this use case. [10] (CO4/K6)
10. Evaluate the security implications of storing user credentials locally versus using Firebase Authentication in a Flutter app. Design a login system with Firebase Authentication and handle success/failure states. [10] (CO3/K4)

BL-Bloom's Taxonomy Levels - (K1-Remembering,K2-Understanding,K3-Applying,K4-Analysing,K5-Evaluating,K6-Creating)

