



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year **2025** – 3rd Year Examination – Semester 6

IT6306 - Mobile Application Development

Structured Question Paper
(TWO HOURS)

To be completed by the candidate

Important Instructions:

- The duration of the paper is **2 (Two) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **11 pages**.
- **Answer all questions.** All questions carry **equal** marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.
- All kinds of electronic devices including calculators are **not** allowed.
- *All Rights Reserved.*

Questions Answered

Indicate by a cross (✖), (e.g. ☐ 1 ☐) the numbers of the questions answered.

To be completed by the candidate by marking a cross (✖).	Question numbers			
	1	2	3	4
To be completed by the examiners:				

01.

(25 marks)

(a) Briefly explain the mobile strategy rule of thumb “Do not convert, create”

(4 marks)

by understanding your user and his context you can best create a tailored mobile experience. The mobile is a unique medium with its own benefits simply applying the same rationale to mobile strategy as in the web or print strategy will be disadvantageous.

L1-Introduction to mobile applications_vVLE.pdf

L2-Mobile application development platforms_vVLE.pdf

L3-Mobile Application Dev - Native App Dev with Android_vVLE.pdf

L4-Design for Mobile Applications_vVLE.pdf

L5-Android Architecture Components and Room Database_vVLE.pdf

L6-Deployment and Monetization.pdf

(b) Briefly explain how a Web framework provides **two (02)** advantages from Android's Java API framework for developing an application that has a shopping cart for customers.

(4 marks)

L1 slide 27: Java API framework is Android only hence the code is not portable across various platforms unlike web hence more users can access the shopping cart

Does not need installation on the device : new customers will instantly be able to join

Without installing anything OR Other valid answers

- (c) Order the following layers of the mobile ecosystem keeping the **Applications** layer at the top. {Applications, Application Frameworks, Devices, Networks, Operating Systems, Operators.}

(5 marks)

Applications, Application Frameworks, Operating Systems, Devices, Networks, Operators : L1 Slide 13

- (d) Write a brief note on one mobile operating system that you know of, covering **four (04)** points : its name, manufacturer, source type(open/proprietary) and usage.

(4 marks)

The Android operating system is the most popular operating system today. It is based on the Linux Kernel and open-source software. The android operating system was developed by Google.] L2 slide 6.

- (e) Briefly describe the following parts of Android platform architecture.

i) ART

ii) HAL

iii) Kernel

iv) Java API framework

(2x4 = 8 marks)

explanation description given in L2 slide 16 and above.

02.

(25 marks)(a) Name **five (05)** features of Figma that promote designer productivity.**(5 marks)**

*Figma– Real-time collaboration– Vector editing– Prototyping– Design components–
Version history L4- slide 64*

(b) Briefly explain **three (03)** aspects of **Context** element in mobile design.

(6 marks)

Context - Physical environment (location, noise, lighting, etc.)

– Device characteristics (screen size, input methods, network speed, etc.)

– User's goals, motivations, and emotional state

– Socio-cultural factors (language, cultural norms, accessibility needs, etc.) (Any 3)

L4- slide (14)

(c) What is meant by a “best practice” in mobile design? Why might a designer avoid adhering to a particular best practice in their mobile design?

(6 marks)

A Best practice refers to an approach of design that has been used by successful past designs and agreed upon by a community/group. Also sometimes referred to as a rule of thumb.

Although it is recommendable in general it does not mean that the best practice can always be adhered to and the designer has no authority to bend the rules. Under the specific circumstances of the design the designer may decide to deviate from the best practice or abandon it.

- (d) Write a relationship that allows one to calculate the PPI of a given mobile screen, provided **two(02)** physical parameters of the same screen hardware.

(5 marks)

Pixels per inch / Pixel density is determined by dividing the width of the display area(W_p) in pixels by the width of the display area in inches (W_i)

$PPI = W_p / W_i$ (Need to explain the meaning of parameters)

L4 - Slide 47

- (e) Briefly explain the “**message**” element in mobile design.

(3 marks)

Message is the overall impression you create through

It may be part of the brand identity

visual design– It is important to look at user perspective when designing the message

L4 slide 17

03.

(25 marks)

- (a) Prototyping is an effective technique for initiating the design of mobile applications. Break down the prototyping process to simpler steps, providing a short description for each.

(4 marks)

Sketch your idea (Create wireframes, add UI elements)

– Animate and interact (Define transitions, gestures, and animations)

– Share and collaborate (Invite team members, get feedback, iterate)

– User testing (Gather insights, analyze, and optimize)) L4- slide 69

- (b) Explain **ANR** in Android and list **three (03)** causes for **ANR** problems in Android applications.

(5 marks)

Network operations, Long calculations, Downloading/uploading files, Processing images

•Loading data L3- slide 94

- (c) Draw **two(02)** transition diagrams for an Android Service life cycle taking bounded and unbounded service with important **callbacks** marked and named. You may draw the diagrams parallel to each other.
(16 marks)

L3- slide 88

04.

(25 marks)

- (a) Write short notes to the following questions related to Room library and accompanying Android components. **Note** : You must write enough points to get the allocated marks for each sub-question

- (i) @ColumnInfo annotation

(2 marks)

Specify column name to save the property. If different from member variable name] L5 - Slide 20

- (ii) @Entity annotation

(2 marks)

Each @Entity instance represents an entity/row in a table • Specify the name of the table if different from class name] L5 - Slide 19

- (iii) @PrimaryKey annotation

(2 marks)

Entity class must have a field annotated as primary key • You can auto-generate unique key for each entity L5- Slide 19

- (iv) @NotNull annotation

(2 marks)

Denotes that a parameter, field, or method return value can never be null • Use for mandatory fields] L5 -slide 20

(v) Room Library, Database component and Dao component

(2x3=6 marks)

Room is a powerful ORM framework/ Object mapping library (L5 Slide 25 - 2 marks)

Auto generates android SQL code

Dao provides methods to access the database /read and write operations (2 marks)

Dao Provides clean APIs for application code to deal with data

Database component is the database holder/ represents the database. Used to create or connect to database (2 marks)

(vi) LiveData

(4 marks)

LiveData is a data holder class that is aware of lifecycle events. It keeps a value and allows this value to be observed. Use LiveData to keep your UI up to date with the latest data. LiveData notifies observers when data changes. It's lifecycle aware: knows when device rotates or app stops. L5 Slide 31

(b) Enterprise mobile apps are released from specific MDM/MAM services. In contrast, write **three (03)** strategies used to release an Android consumer mobile application to users.

(3 marks)

A market place such as google playstore - On your own website for download. - by directly sending it to the user] L6 - Slide 9

- (c) Briefly explain the **versionCode** parameter in the Gradle build file. Include **four (04) points** in your answer.

(4 marks)

- Positive integer used as an internal version number
- Helps determine whether one version is more recent than another
- Higher numbers indicate more recent versions
- Not the version number shown to users] L6 - Slide 20
