

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering



Study Programme	: Bachelor of Software Engineering Honours Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	: EEI3269/EEX3269 Introduction to Mobile Application Development
Academic Year	: 2024/25
Date	: 22 nd February 2026
Time	: 0930-1230h
Duration	: 3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Four (4)** questions in **Four (4)** pages.
3. Answer **all** questions.
4. Answer for each question should commence from a new page.
5. This is a Closed Book Test (CBT).

Question 01

The Case for Question No 1: SmartEV Connect

Sri Lanka is gradually adopting Electric Vehicles (EVs) to reduce carbon emissions and fuel dependency. EV users face challenges such as limited access to charging stations, lack of real-time battery health insights, range anxiety, and insufficient predictive maintenance support. To address these challenges, the Smart Mobility Innovation Unit (SMIU) proposes SmartEV Connect, a mobile application integrating AI, IoT, and smart systems to support EV owners, charging station operators, and service providers. The application includes:

- Real-time EV battery monitoring via IoT sensors
- AI-based battery health prediction
- Smart charging station discovery and booking
- Route optimization based on battery range
- Predictive maintenance alerts
- Usage analytics dashboards
- Offline support for low-connectivity areas
- Secure cloud-based data management

The app is being developed using React Native and must be completed within 6 months. You are appointed as the Mobile Application Developer and Team Lead at SMIU.

- a. The development team plans to use the Scrum framework for this project. As the team lead, state **two (2)** important points to discuss at the first brainstorming meeting. (2 marks)
- b. The team was decided to use a Hybrid App Development approach. However, after analyzing the requirements in depth, they agreed to use a Cross-Platform Development approach. As a team leader, list **four (4)** reasons for the team decision. (4 marks)
- c. Briefly list **three (3)** advantages and **three (3)** disadvantages of having Hybrid App Development. (6 marks)
- d. Once the requirements were finalized, the UI/UX designer started working on the SmartEV Connect application User Interface (UI) design. What are the main **six (6)** stages UI/UX Engineer needs to follow during the UI design process of the SmartEV Connect interfaces? (6 marks)
- e. During the app development stage, the development team demonstrated **four (4)** basic components of a mobile application. Identify each component and describe **one** key function of each with reference to the SmartEV Connect application. (6 marks)
- f. At the initial stage project team classified application requirements into **three (3)** categories. Identify the three categories and explain each briefly, and give one practical example from the SmartEV Connect application for each category. (3 marks)
- g. The Sales Team suggested an Affiliate Partnership Model as a monetization strategy for the SmartEV Connect application. Critically evaluate why this strategy would be appropriate for the application, using **three (3)** practical reasons. (3 marks)
- h. As a developer, you are tasked with completing the dashboard UI by filling in the blanks with the appropriate React Native components. Provide your answers in the specified order on the answer sheet. (10 marks)

```
import React, { ____(I)___ } from 'react';
import { Text, Image, Button, TextInput, ScrollView,
        FlatList, ActivityIndicator, Alert, StyleSheet } from 'react-native';

export default function Dashboard() {
  const [batteryLevel, setBatteryLevel] = ____(II)___(80);
  const [searchText, setSearchText] = useState('');

  ____(III)___ stations = [
    { id: '1', name: 'Colombo EV Fast Charger' },
    { id: '2', name: 'Kandy Smart EV Station' }
  ];

  return (
    <__(IV)___ style={styles.container}>
```

```

    { /* Logo */ }
    <Image
      source={__(V)__( './assets/dashboard_a.png' )}
      style={styles.logo}
    />

    { /* App Title */ }
    <Text style={styles.title}>__(VI)____</Text>

    { /* EV Image */ }
    <Image
      source={{ __(VII)__: 'https://ev-electric-car' }}
      style={styles.image}
    />

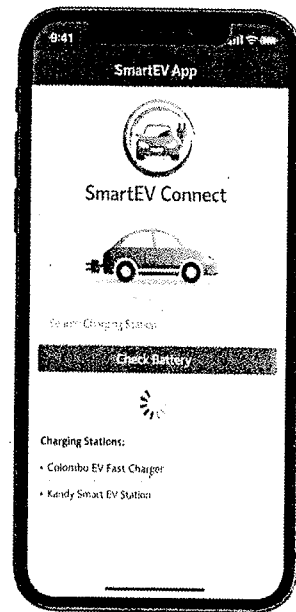
    { /* Search Input */ }
    <TextInput
      __(VIII)___="Search Charging Station"
      style={styles.input}
      value={searchText}
      onChangeText={text => setSearchText(text)}
    />

    { /* Battery Check Button */ }
    <Button
      title="Check Battery"
      onPress={() => Alert.alert('Battery Status', `Battery Level: ${batteryLevel}%`)}
    />

    { /* Loading Indicator */ }
    <__(IX)___ size="large" style={{ marginVertical: 20 }} />

    { /* Charging Stations List */ }
    <Text style={styles.subtitle}>Charging Stations:</Text>
    <__(X)___
      data={stations}
      keyExtractor={item => item.id}
      renderItem={({ item }) => <Text style={styles.station}>{item.name}</Text>}
    />
  </ScrollView>
);
}

```



Question 02

Mobile operating systems manage device hardware and software resources while providing a platform for applications, making it essential to understand their functions, architectures, and differences between Android and iOS.

- Identify and explain **four (4)** key functions of a mobile operating system that are critical for the successful operation of a mobile application. (4 Marks)
- Briefly explain how improper management of these operating system functions could negatively impact mobile application. (4 Marks)
- Describe the main layers of a mobile operating system and explain how each layer contributes to application performance. (6 Marks)
- Define open-source and closed-source mobile operating systems and provide **two (2)** examples for each. (6 Marks)

Question 03

Mobile marketing metrics are essential for evaluating the effectiveness of mobile marketing campaigns, as they help businesses measure Key Performance Indicators (KPIs) and make data-driven decisions to optimize organization strategies.

- Define **four (4)** factors that organizations should consider while choosing mobile advertisements for their campaigns. (4 Marks)
- Briefly explain the mobile advertising performance metrics **CPL** and **CPV**. (4 Marks)
- Freemium distribution is more popular in the mobile games domain. Compare **three (3)** main characteristics of the Freemium distribution model with the Commission model and present your answer in a tabular format. (6 Marks)
- As a mobile developer, critically explain how monetization strategies should be implemented while ensuring mobile security, including measures to prevent data leaks and secure communication. (6 Marks)

Question 04

Mobile application frameworks improve development efficiency, while publishing platforms enable effective deployment and distribution of mobile apps.

- State how mobile app frameworks assist developers in building mobile applications. (4 Marks)
- What is an 'apk' file, and what role does it play in the Android mobile application publishing process? (4 Marks)
- Fill in the missing characteristics in the following **Table Q4** based on the given frameworks. (6 Marks)

Table Q4

Framework	Primary Language	Best Use Cases	Performance
React Native	I.).....	II.).....	III.).....
Flutter	IV.).....	Cross Platform	Excellent
Ionic	JavaScript/HTML/CSS	V.).....	Moderate
Xamarin	C#	Enterprise apps	Near native
Unity	C#	VI.).....	Excellent

- Explain why mobile publishing platforms are necessary in the mobile app development process. Justify your answer by describing **three (3)** technical steps and prerequisites required for publishing Android applications. (6 Marks)

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