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**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**SPECIAL/SUPPLEMENTARY  
YEAR THREE SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE IN  
COMPUTER SCIENCE**

**COURSE CODE : CSC 314**

**COURSE TITLE : MOBILE COMPUTING**

**DATE: 31/07/2023**

**TIME: 08:00 A.M – 10:00 A.M.**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

### QUESTION ONE [COMPULSORY] [30 MARKS]

1. A device A transmits a beacon signal at time 1000 (measured using A's clock), which is received by a device B at 2000 (measured using B's clock). Device B then responds with a signal at 2500 (using its own clock), which is then received by A at 3300 (using its own clock).
  - (a) What is the distance computed by node A if the signal velocity is 1m per 100-time units? [6Marks]
  - (b) What can you say about the synchronization of the two devices? [4Marks]
1. Write the directory path where images are stored while developing an Android application. [1Mark]
2. Define services in Android operating system. [2Marks]
3. Describe the following different tiers in the 3-tier architecture of mobile computing. Tier1, 2, 3. State examples of services offered in each tier. [6 Marks]
4. Describe 3 characteristics exhibited by a mobile communication device. [3 Marks]
5. State and explain four advantages and four disadvantages of satellite transmission. [8Marks]

### QUESTION TWO [20 MARKS]

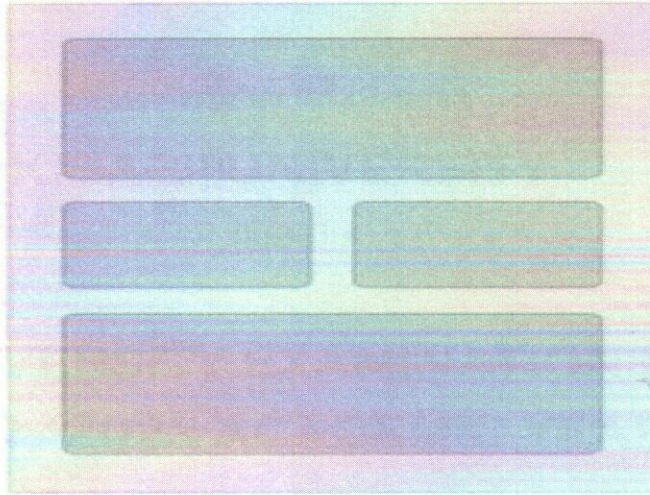
2. Explain how tunneling works in general and especially for mobile IP using IP-in-IP, minimal, and generic routing encapsulation respectively. Discuss the advantages and disadvantages of these three methods. [8Marks]
3. Explain the difference between 1G, 2G, 2.5G, 3G, 4G and the LTE mobile technologies. [6 Marks]
4. Describe the limitations of mobile devices. [2Marks]
5. Explore the Steps to install and configure Android Studio and SDK. [4Marks]

### QUESTION THREE [20 MARKS]

1. Differentiate between JVM and DVM. [4Marks]
2. Explain the concept behind the traditional TCP. What are the improvements that are made into the classical TCP? [8Marks]
3. List and describe any two Mobile IP components [4Marks]
4. Write a program to display a circular progress bar. [4Marks]

### QUESTION FOUR [20 MARKS]

1. Discuss the protocol architecture of GSM. [10 Marks]
2. Observe the following GUI and write an XML file using relative layout to create the same. [10 Marks]



### QUESTION FIVE [20 MARKS]

1. Explain the basic requirements of mobile IP. [8Marks]
2. Describe the significance of SQLite database in Android. [4Marks]
3. A satellite's job in the communications network is to serve as a repeater. Explain [2Marks]
4. What are the functions of authentication and encryption in GSM? [6Marks]