



Kasarani Campus  
Off Thika Road  
Tel. 2042692 / 3  
P. O. Box 49274, 00100  
NAIROBI  
Westlands Campus  
Pamstech House  
Woodvale Grove  
Tel. 4442212  
Fax: 4444175

**KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR**  
**THIRD YEAR, FIRST SEMESTER EXAMINATION**  
**FOR THE BACHELOR OF BUSINESS & INFORMATION TECHNOLOGY**  
**KBI 2317 – MOBILE COMPUTING**

Date: 17<sup>TH</sup> April 2024  
Time: 2:30PM – 4:30PM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Discuss the following terms as used in mobile computing.
- i) Handing over (1 Mark)
  - ii) Cell (1 Mark)
  - iii) Mobile base station (1 Mark)
- b) Distinguish between the first, second and third and fourth generation of wireless cellular networks based on access protocols they use. (4 Marks)
- c) Discuss why we use hexagonal shape in cellular networks for cells. (2 Marks)
- d) Explain how tunneling works especially for mobile IP using IP-in-IP, minimal and generic routing encapsulation. (3 Marks)
- e) Bad mobile strategies often start with bad assumptions. No one in mobile claims to know everything about mobile, it is simply too large of an ecosystem to keep tabs on all the facets. Based on this assertion highlight five guidelines to be followed when developing a mobile strategy. (5 Marks)
- f) In Mobile computing there are many Issues and impact that we can identify and investigate their technical significance. The rapidly expanding technology of cellular communications, wireless LAN, and satellite services will make it possible for mobile users to access information anywhere and at any time. In the near future, millions of users will be carrying a portable computer, often called a personal digital assistant or a personal communicator. These devices will be diskless; store data in clouds. These devices will be powerful laptop computers with large memories and powerful processors. Regardless of size, all mobile computers will be equipped with a wireless. Based on those assertions, answer the question that follow:
- i) Identify five ways in which you can make money from this growing market. (5 Marks)
  - ii) Discuss the working of ARPU as the key performance indicator for all things mobile. (2 Marks)
  - iii) Explain three problems/issues likely to be experienced with the continuous rapid growth of cellular communications technology. (6 Marks)

**QUESTION TWO (20 MARKS)**

- a) Define the following terms:
- i) Mobile Switching Centre (1 Mark)
  - ii) Mobile station (1 Mark)
- b) Using an illustration, discuss the GSM architecture in mobile computing. (5 Marks)
- c) Describe the following mechanisms used to enable multiple use of a shared medium in mobile communication. Give ONE advantage and ONE disadvantage of each access mechanism.
- i) FDMA (3 Marks)
  - ii) TDMA (3 Marks)
  - iii) CDMA (3 Marks)
- d) Discuss two location management implementation methods in mobile computing. (4 Marks)

**QUESTION THREE (20 MARKS)**

- a) Explain the terms airtime and idle time as used in mobile stations. (4 Marks)
- b) Describe the following technologies:
  - i) GPRS (2 Marks)
  - ii) UMTS (2 Marks)
  - iii) VoIP (2 Marks)
- c) There are some actions that are necessary in order to obtain reliability over wireless mobile network. Discuss at least three of such actions (6 Marks)
- d) Differentiate between 2G and 3G cellular communication in GPRS (4 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Highlight five drawbacks of mobile computing. (5 Marks)
- b) Discuss the following concept in cell planning.
  - i) Frequency reuse (2 Marks)
  - ii) Cell cluster (2 Marks)
- c) Mobile devices have already outpaced the majority of media we rely on every day, including computers. Today, more people access the Web via a mobile device than via a computer. State five unique and competitive benefits of Mobile as a Mass media in the modern world. (5 Marks)
- d) A certain city has an area of 1300 square miles and is covered by a cellular system using a seven-cell reuse pattern. Each cell has a radius of 4 miles and the city has 40MHz spectrum with a full duplex channel bandwidth of 60KHz. Find:
  - i) The number of cells in the service area (3 Marks)
  - ii) The number of channels per cell (3 Marks)

**QUESTION FIVE (20 MARKS)**

- a) Define the following as used in mobile computing:
  - i) Pervasive computing (1 Mark)
  - ii) Nomadic computing (1 Mark)
  - iii) User mobility (1 Mark)
- b) Discuss the mobile ecosystem identifying all the layers involved together with their roles. (9 Marks)
- c) Using a sample mobile application design, describe four elements of such a design. (8 Marks)