



# KENYA METHODIST UNIVERSITY

## END OF 2<sup>ND</sup> TRIMESTER 2010 EXAMINATIONS

**FACULTY** : **SCIENCE AND TECHNOLOGY**  
**DEPARTMENT** : **COMPUTER SCIENCE & BUSINESS INFORMATION**  
**UNIT CODE** : **CISY 436**  
**UNIT TITLE** : **WIRELESS COMMUNICATIONS**  
**TIME** : **2 HOURS**

---

**Instructions:** Answer Question **one** and any other **two** questions.

### Question 1 (30 Mks) Compulsory

- a. What do you understand by the term decibel? How do you calculate it? [4 MKS]
- b. The power available in an 802.11 system can be characterized by the various factors. Give and explain any three you have learnt. [6 MKS]
- c. What are some of the things you can do to protect your wireless network? [5 MKS]
- d. A cellular network consists of both land and radio based sections. Such a network is commonly referred to as a PLMN - public land mobile network. The network is composed of five entities, give and explain each. [5 MKS]
- e. In Mobile IP protocol, explain the role of care-of address. [2 MKS]
- f. We want to estimate the feasibility of a 5 km link, with one access point and one client radio. The access point is connected to an omnidirectional antenna with 10 dBi gain, while the client is connected to a sectorial antenna with 14 dBi gain. The transmitting power of the AP is 100mW (or 20 dBm) and its sensitivity is -89 dBm. The transmitting power of the client is 30mW (or 15 dBm) and its sensitivity is -82 dBm. The cables are short, with a loss of 2dB at each side. Find
  - i. The total gain
  - ii. The path loss for a 5 km link [4 MKS]
- g. Give any four Advantages of GSM over the Analog Systems [4 MKS]

### Question 2 (15 Marks)

- a. A wave has a certain *speed*, *frequency*, and *wavelength*. Define the terms wavelength and *frequency* and give their relationship to the speed of a radio wave. [6 MKS]
- b. Adding amplifiers will not magically solve all of your wireless networking problems. Why? [4 MKS]
- c. What do you understand by OFDM? Give any three advantages of using OFDM. [4 MKS]
- d. Satellite systems are typically characterized by the height of the satellite orbit. Give and explain the three satellite types. [6 MKS]

**Question 3 (15 Marks)**

- a. Microwaves have two main absorbent materials. Give and explain how they are affected. [4 MKS]
- b. With the aid of diagrams give and explain any four types of antennas that are used in wireless communications. [8 MKS]
- c. What are some of the characteristics of Value added services in a wireless network. [4 MKS]
- d. What are some of the threats that exist in a wireless communication network? [4 MKS]

**Question 4 (15 Marks)**

- a. There are a few simple rules of thumb that can prove extremely useful when making first plans for a wireless network in relation to characteristics of waves. Give three. [3 MKS]
- b. What are some of the points to consider when choosing a cable for use with microwave devices? [4 MKS]
- c. Network monitoring is the use of logging and analysis tools to accurately determine traffic flows, utilization, and other performance indicators on a network. What are some of the critical questions that you must answer when monitoring? [4 MKS]
- d. Define the terms: i) fading and ii) multipath loss. [4 MKS]
- e. There are several benefits to implementing a good monitoring system for your network. Give any five. [5 MKS]