



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIFTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL AND ELECTRONICS ENGINEERING)

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

EEE509: MOBILE AND WIRELESS COMMUNICATIONS

DATE:

TIME:

Instructions to candidates:

This paper consists of FIVE Questions.

Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each].

Write your college number on the answer sheet.

This paper consists of 3 printed pages

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

QUESTION ONE [30 Marks]

- a) Explain the chronological development history of mobile radio systems. [5 marks]
- b) Define the following terms: [4 marks]
 - i. Frequency; HLR; VLR
 - ii. MSC
- c) Explain the concept of soft hand-off and hard hand-off of cellular network. [4 marks]
- d) Explain the mechanism involved in channel allocation strategies. [2 Marks]
- e) List the advantages and disadvantage of Okumura model. [2 marks]
- f) Using illustration, explain the functional unit of GSM network. [4 Marks]

- g) Compare FDMA, TDMA & CDMA for cellular communication. [3Marks]
- h) Explain Diffraction Model. [4Marks]
- i) Describe the principles of direct sequence spread spectrum technique. [2Marks]

QUESTION TWO

[20Marks]

- a) Discuss two types of wireless services and their requirements. [6Marks]
- b) Explain in detail the evolution of wireless communication. [5Marks]
- c) Explain briefly the factors that influence small scale fading [4Marks]
- d) State the advantages of digital modulation techniques hence highlight the factors that influence the choice of digital modulation [5Marks]

QUESTION THREE

[20Marks]

- a) Explain four diversity mechanism techniques that are used in wireless communication. [12Marks]
- b) Explain how RAKE Receiver system model counter measure signal degradation in wireless communication on time domain. [8Marks]

QUESTION FOUR

[20Marks]

- a) Explain in detail the different techniques used to improve coverage & capacity of cellular. [6Marks]
- b) Deduce an expression describing received power for reflection model [8Marks]
- c) Give the comparison between fixed channel allocation and dynamic channel allocation. [6Marks]

QUESTION FIVE

[20Marks]

- a) Discuss about 3G standards – WCDMA/UMTS for wireless network hence distinguish between 3G and 4G.
[10Marks]
- b) With an aid of diagram explain how OFDM as a modulator has attributed to IP communication for 4G and enlist its advantages, disadvantages and applications.
[10Marks]