



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIFTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL AND ELECTRONICS ENGINEERING)

EEE 509: MOBILE AND WIRELESS COMMUNICATIONS

DATE: 16/8/2021

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

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 (COMPULSORY)(30MARKS)

- a) Highlight the features of IS-54 Digital cellular . (4 marks)
- b) Define the following terms: (4 marks)
 - i) Cell sector
 - ii) BSS,BTS and MSC
- c) Explain the concept of frequency reuse and hexagonal cell pattern of cellular network. (4 marks)
- d) Demonstrate how radio resources are managed and enlist the technical issues encountered during cellular network planning . (4 marks)
- e) What is PHP? hence Enlist the features of PHP and its applications. (4 marks)
- f) Highlight the features of the following DECT,TDMA & CDMA. (3 marks)
- g) Explain the importances of standards in cellular system. (3 marks)
- h) Distinguish between 3G and 4G cellular networks. (4 marks)

QUESTION TWO (20 MARKS)

- a) Explain the development history of mobile radio systems. (8 marks)
- b) Explain the GSM architecture. (8 marks)
- c) Outline the advantages of digital modulation techniques hence state the factors that influence the choice of digital modulation (4 marks)

QUESTION THREE (20 MARKS)

- a) Explain in detail about the Mobile radio standards around the world. (10 marks)
- b) Explain in detail about wireless network topologies (6 marks)
- c) Give the comparison between fixed channel allocation and dynamic channel allocation. (4 marks)

QUESTION FOUR (20MARKS)

- a) Explain in detail the different techniques used to improve coverage & capacity of cellular. (5 marks)
- b) Explain in detail the fading effects in wireless channel. (5 marks)
- c) Explain the Power Control mechanism in CDMA. (5 marks)
- d) What are the security threats to wireless networks? (5 marks)

QUESTION FIVE (20 MARKS)

- a) Describe in detail the Radio Propagation and Propagation Path-Loss Models. (6 marks)
- b) Explain how OFDM as a modulator has attributed to seamless communication and connectivity for 4G and enlist its advantages, disadvantages and applications. (6 marks)
- c) Using illustration, explain the concept of Rake receiver system as it is demonstrated in TDMA. (8 marks)