(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER TWO

FOR THE DEGREE OF
COMPUTER SCIENCE

COURSE CODE : CSC 454E

COURSE TITLE : WIRELESS SYSTEMS & PROTOCOLS

DATE: 06/11/2020   TIME: 9.00 A.M – 11.00 A.M

INSTRUCTIONS:

ANSWER QUESTIONS ONE and ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

a) What is cellular topology? [2 marks]

b) Discuss the following
   i. Hard handoff [2 marks]
   ii. Soft handoff [2 marks]

c) Many organizations today implement both wired and wireless networks. As a network architect, what could be the difference between the two upon implementation. [4 marks]

d) Outline the different types of cells. [3 marks]

e) Describe the technical issues in planning of a cellular network? [3 marks]

f) Differentiate between the following terminologies.
   i. Microcells and picocells [2 marks]
   ii. GPRS and GSM [2 marks]
   iii. TDMA and CDMA [2 marks]

g) Explain how internet service providers can use Carrier Sense Multiple Access/Collision Avoidance. [5 marks]

h) Practically every cellular system has some kind of broadcast mechanism that can be used directly for distributing information to multiple mobiles. Discuss how this is achieved using paging. [3 marks]

QUESTION TWO [20 MARKS]

a) What is a cell? [2 marks]

b) Identify and explain the three types of Communications. [3 marks]

c) Enumerate the various multiple access schemes used in wireless communication. [3 marks]

d) As a specialist in the wireless networking industry, explain why you think MANET networks are beneficial. [6 marks]

e) Explain the characteristics of mobile ad hoc networks [6 marks]

QUESTION THREE [20 MARKS]

a) What is an ad hoc architecture? [2 marks]

b) Explain the Bluetooth technology as used in mobile communication. [6 marks]

c) Discuss the multiple access problem encountered in telephony. [4 marks]

d) Differentiate between Physical Channel and Logical Channel as used in GSM channels.

[4 marks]

e) State the reason why wireless LANs cannot implement CSMA/CD. [4 marks]

QUESTION FOUR [20 MARKS]

a) Discuss the following

   i.   Frequency reuse [3 marks]

   ii. Hexagonal Cell Geometry [3 marks]

b) Explain in detail the fading effects in wireless channel. [6 marks]

c) Using a well labelled diagram explain the UMTS Architecture. [8 marks]

QUESTION FIVE [20 MARKS]

a) Discuss each of the following wireless technologies.

   i.   EDGE [2 marks]

   ii. UMTS [2 marks]

b) Discuss the underlying principle of wireless network topologies [4 marks]

c) Evaluate the key differences between cellular an Adhoc network environments.

[4 marks]

d) Explain in detail the ALOHA and slotted ALOHA random access protocols used in wireless systems [8 marks]