UNIVERSITY EXAMINATIONS

EXAMINATION FOR SEPTEMBER/DECEMBER 2019/2020 FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

RCS 309: WIRELESS NETWORKS

DATE: 16TH DECEMBER 2019 **TIME: 2 HOURS**

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during reading time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**
10. **DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A (COMPULSORY)

Question One (30 Marks)

a. State and describe five wireless propagation problems. (**5marks**)

b. Distinguish between omnidirectional and dish antennas in terms of operation. **(3marks**)

c. Illustrate your understanding on the following terms as used in radio propagation.

i. Attenuation **(2marks)**

ii. Noise **(2marks)**

iii. Fading **(2marks)**

d. State and describe the elements in a typical 802.11 LAN. Why is a wired LAN usually still needed if you have a wireless LAN. **(5 marks)**

e. |Describe the components and structure of a Cell phone network **(5 marks)**

f. State and explain the difference between the two unlicensed bands that WLAN s operates in? **(3 marks)**

g. Describe three spread spectrum transmission method **(3 marks)**

SECTION B (ANSWER ANY TWO QUESTIONS)

Question Two (20 Marks)

a. Describe the three types of satellite orbits? **(6 marks)**

b. In radio operation how does channel bandwidth relate to bandwidth required to transmit a data stream at a given speed? **(2 marks)**

c. Explain five types of functions remote access point management systems provide?

(5 marks)

d. Differentiate between the two types of wireless networks as defined by the 802.11standard **(3 marks)**

e. Distinguish between handoff and roaming in cellular telephony? **(4 marks)**

Question Three (20 Marks)

a. Explain the five sub systems of a satellite system. **(10 marks)**

b. What are the two technologies that offer remote access point management? (**2 marks)**

c. Distinguish between 2G and 3G service for data transmissions **(3 marks)**

d. Discuss five services defined by the IEEE 802.11 network standard**.** **(5 marks)**

Question Four (20 marks)

a. Describe the process of CSMA/CA+ ACK as used in media access control **(5 marks)**

b. Describe four properties of antennas **(4 marks)**

c. State and describe four ad hoc routing protocols used in mobile communication **(8 marks)**

d. What are the two mechanisms for media access control according to the 802.11 standard for WLANs **(2 marks)**

e. What do you understand by the term basic service area **(1 mark)**

Question Five (20marks)

a. Describe how a wireless LAN is extended and state the various devices used to achieve the extension **(3 marks)**

b. State the two function of the MSTO in a cellular telephony **(1marks)**

c. Define and distinguish FDMA and TDMA as used in Duplex communications? **(4mark)**

d. Describe five functions of the mobile ATM **(5 marks)**

e. What are the two benefits of MIMO? **(2marks)**

f. State five properties of the radio signals **(5 marks)**