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*(Knowledge for Development)*

## **KIBABII UNIVERSITY**

### **UNIVERSITY EXAMINATIONS 2016/2017 ACADEMIC YEAR**

### **SPECIAL/SUPPLEMENTARY EXAMINATIONS YEAR FOUR SEMESTER TWO EXAMINATIONS**

### **FOR THE DEGREE OF BACHELOR OF SCIENCE COMPUTER SCIENCE**

**COURSE CODE : CSC 455E**

**COURSE TITLE : WIRELESS SYSTEMS & PROTOCOLS**

**DATE: 26/09/2017**

**TIME: 08:00 A.M – 10:00 A.M**

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#### **INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

**QUESTION ONE (COMPULSORY) [30 MARKS]**

- a) What is Cellular telephony [2 marks]
- b) Identify the desirable features offered by cellular networks. [3 marks]
- c) Differentiate between the following terminologies.
- i. Microcells and picocells [2 marks]
  - ii. GPRS and GSM [2 marks]
  - iii. TDMA and CDMA [2 marks]
- d) Explain how internet service providers can use Carrier Sense Multiple Access/Collision Avoidance. [5 marks]
- e) Explain what you understand by the following terms.
- i. Handoff [3 marks]
  - ii. Frequency-Reuse [3 marks]
  - iii. Signal Fading [3 marks]
- f) 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. [5 marks]

**QUESTION TWO [20 MARKS]**

- a) What is a WAP protocol? [2 marks]
- b) Differentiate between
- i. Mobile station (MS) and Base station transceiver (BST) [2 marks]
  - ii. Base station controller (BSC) and Mobile switching centre (MSC) [2 marks]
  - iii. WIFI and WIMAX technologies [2 marks]
- c) Discuss the following mobile communication technologies
- i. Paging [3 marks]
  - ii. Cellular Radio Networks [3 marks]
  - iii. Mobile Radio [3 marks]

- iv. Communication Satellites [3 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) What is Universal Mobile Telecommunications System (UMTS)? [2 marks]  
b) State the data rates supported by UMTS for rural, urban outdoor and low range outdoor [3 marks]  
c) Using a well labelled diagram explain the UMTS Architecture. [8 marks]  
d) Outline the advantages of LTE for both the network operators and end users. [7 marks]

**QUESTION FIVE [20 Marks]**

- a) Discuss each of the following wireless technologies.  
i. Bb QPRS [4 marks]  
ii. EDGE [4 marks]  
iii. UMTS [4 marks]  
b) Name the main differences between multi-hop ad-hoc networks and other networks. What advantages do these ad-hoc networks offer? [8 marks]