



*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2020/2021 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS  
YEAR FOUR SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF  
(COMPUTER SCIENCE)**

**COURSE CODE : CSC 454E**

**COURSE TITLE : WIRELESS SYSTEMS & PROTOCOLS**

**DATE: 01/10/2021**

**TIME: 02.00 P.M – 04.00 P.M**

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**INSTRUCTIONS TO CANDIDATES**

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

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

- a) What is a cellular system? [2 marks]
- b) In the implementation of mobile communications systems what are the disadvantages of using small cells. [6 marks]
- c) As the demand for wireless service increases, the number of channels assigned to a cell eventually becomes insufficient to support the required number of users. The cellular design techniques are needed to provide more channels per unit coverage area. Discuss Three (3) methods of improving the coverage and capacity. [9 marks]
- d) Differentiate between the following GSM system types of handover
- i. Intra-BTS handover and Inter-BTS Intra BSC handover [2 marks]
  - ii. Inter-BSC handover and Inter-MSC handover [2 marks]
  - iii. International mobile subscriber identity (IMSI) and Temporary mobile subscriber identity (TMSI) [2 marks]
- e) Outline the steps needed to connect the calling station with the mobile user. [7 marks]

### QUESTION TWO [20 MARKS]

- a) Discuss the advantages and disadvantages of GPRS. [6 marks]
- b) Using a well labelled diagram explain how the protocol architecture of the transmission plane for GPRS works. [8 marks]
- c) Discuss each of the following modes of GPRS operation.
- i. Initialization/Idle [2 marks]
  - ii. Standby [2 marks]
  - iii. Ready [2 marks]

### QUESTION THREE [20 MARKS]

- a) Differentiate between cellular networks and ad-hoc networks [6 marks]
- b) Discuss the requirements of Mobile ad-hoc network. [4 marks]
- c) Explain why TCP does not perform well in adhoc wireless networks? [6 marks]
- d) As a specialist in the wireless networking industry, explain why you think MANET networks are beneficial. [4 marks]

### QUESTION FOUR [20 MARKS]

- a) Define Tunneling [2 marks]
- b) Differentiate between encapsulation and decapsulation [3 marks]
- c) In mobile IP, there exist several ways of performing the encapsulation needed for the tunnel between HA and COA. Discuss these approaches. [6 marks]
- d) What is your understanding of triangular routing with the basic mobile IP protocol? [4 marks]
- e) Discuss the four additional messages that an optimized mobile IP protocol needs to effectively carry out optimization. [5 marks]

### QUESTION FIVE [20 Marks]

- a) As a Network engineer in your esteemed company explain to top management why they should consider the implementation of Wireless networking technology over the traditional wired networks. [4 marks]
- b) State the reason why wireless LANs cannot implement CSMA/CD. [4 marks]
- c) Discuss each of the following WLAN technologies.
  - i. Narrowband [2 marks]
  - ii. Spread Spectrum [2 marks]
  - iii. Frequency Hopping Spread Spectrum (FHSS) [2 marks]
  - iv. Direct Sequence Spread Spectrum (DSSS) [2 marks]
- d) Explain in detail the fading effects in wireless channel. [4 marks]