



# PIONEER INTERNATIONAL UNIVERSITY

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## UNIVERSITY EXAMINATIONS

ACADEMIC YEAR: 2021/2022

SEMESTER: JAN – APRIL 2022

CODE: BSIT 2240

UNIT: WIRELESS AND MOBILE COMPUTING

DATE: APRIL 2022

TIME: 2 HOURS

### INSTRUCTIONS

Answer *Question one* and *any other two questions*.

#### QUESTION ONE

- a. How are wireless technologies differentiated? **3 Marks**
- b. Explain the importance of standards and describe the role of ITU with regard to telecommunications in the world today. **7 Marks**
- c. Explain any three benefits of wireless solutions. **6 Marks**
- d. Explain the following terminologies:
- (i) Frequency re-use. **2 Marks**
  - (ii) Electromagnetic spectrum. **2 Marks**
  - (iii) CDMA **2 Marks**
- e. Discuss the limitations of the mobile environment. **5 Marks**
- f. State any three factors affecting wireless system design. **3 Marks**

#### QUESTION TWO

- a. (i) What are the properties of infrared? **2 Mark**
- (ii) What three advantages can be associated with using infrared technology? **3 Marks**
- (iii) What are the strengths and weaknesses of focused infrared? **4 Marks**
- b. Each specific transmission system is distinguished by unique factors and limitations, and each has appropriate applications. Therefore, the selection of the most effective transmission system for a given application must be made in the context of a number of key design considerations. Discuss any three of these key design considerations that are applicable to both the wired and wireless environments. **6 Marks**
- c. State five benefits of the GSM technology. **5 Marks**

### QUESTION THREE

- a. Distinguish between “piconet” and “scatternet” as used in Bluetooth technology. **4 Marks**
- b. State Five LEO satellite characteristics. **5 Marks**
- c. With the aid of relevant diagrams, describe the principal components of a digital communication system. **9 Marks**
- d. State any two factors affecting the minimum elevation angle of a satellite earth station’s antenna ( $>0^\circ$ )? **2 Marks**

### QUESTION FOUR

- a. Briefly describe the following types of noise in data communications:  
(i) Thermal noise **2 Marks**  
(ii) Inter-modulation Noise **2 Marks**
- b. Describe any three most common components of a WLAN. **6 Marks**
- c. (i) Describe the kind of access technology do WLANs use and why? **3 Marks**  
(ii) How does the access technology in (i) above work? **4 Marks**
- d. Explain briefly **three** major criteria that a data communication network must meet. **3 Marks**

### QUESTION FIVE

- a. With the aid of simple diagrams, sketch and show the minimum distance between the centers of the cells that use the same frequency in the following cases:  
(i) frequency re-use for 4-cell re-use pattern **4 Marks**  
(ii) frequency re-use for 7-cell re-use pattern **4 Marks**
- b. Discuss any three key transmission impairments. **6 Marks**
- c. Wireless LANs can accommodate various network topologies. The standard defines a BSS as a group of stations that communicate with each other. In this regard, discuss briefly the following 802.11 topologies:  
(i) Ad hoc networks. **2 Marks**  
(ii) Basic Service Set (BSS) **2 Marks**  
(iii) Extended Service Set (ESS) **2 Marks**