



PIONEER INTERNATIONAL UNIVERSITY

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UNIVERSITY EXAMINATIONS

ACADEMIC YEAR: 2021/2022

CODE: BSIT 2240

DATE: APRIL 2022

SEMESTER: JAN – APRIL 2022

UNIT: WIRELESS AND MOBILE COMPUTING

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**