Printed Page:- 04 **Subject Code:- AOE0772**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B. Tech

SEM: VII - THEORY EXAMINATION DEC - 2023

Subject: Wireless communication

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A **20**

1. Attempt all parts:-

1-a. In a wireless communication link, what is the role of the propagation channel?(CO1) 1

(a) To amplify signals

(b) To convert digital signals into analog signals

(c) To transmit data over the internet

(d) To transmit signals between the transmitter and receiver

1-b. Which of the following explains the concept of diffraction loss?(CO1) 1

(a) Archimedes' Principle

(b) Fresnel zone

(c) Principle of Simultaneity

(d) Pascal's Principle

1-c. Which type of message cannot be sent with the help of paging system?(CO2) 1

(a) Alphanumeric message

(b) Video message

(c) Voice message

(d) Numeric message

1-d. Time division duplexing uses _____ to provide both a forward and reverse link.(CO2) 1

(a) Frequency

(b) Time

(c) Time and frequency

(d) Cell spacing

1-e. What does the term "path loss" refer to in wireless communication?(CO3) 1

(a) Loss of signal strength due to obstacles

(b) Loss of signal strength over distance

(c) Loss of signal quality due to interference

(d) Loss of signal coherence in a multipath environment

1-f. Which of the following is a common method to mitigate the effects of shadowing in wireless communication?(CO3) 1

(a) Increasing transmitter power

(b) Using diversity techniques

(c) Introducing frequency interference

(d) Amplifying the received signal

1-g. In TDMA, users are assigned time slots to transmit data. How are these slots organized?(CO4) 1

(a) Non-overlapping in time

(b) Overlapping in time

(c) Non-overlapping in frequency

(d) Overlapping in frequency

1-h. CDMA stands for:(CO4) 1

(a) Code Division Multiple Access

(b) Central Data Multiplexing Algorithm

(c) Cross-Domain Modulation Access

(d) Circuit Division Media Allocation

1-i. Which of the following is a potential disadvantage of using Li-Fi communication?(CO5) 1

(a) Limited coverage area

(b) High power consumption

(c) Slower data rates compared to Wi-Fi

(d) Compatibility with existing devices

1-j. 5G networks are expected to use higher frequency bands, such as millimeter waves. What is a potential advantage of these higher frequencies?(CO5) 1

(a) Longer transmission range

(b) Lower latency

(c) Wider coverage area

(d) Increased data capacity

2. Attempt all parts:-

2.a. What role do base stations play in a cellular network?(CO1) 2

2.b. Describe the use of smart antennas in cellular systems.(CO2) 2

2.c. What are common propagation issues in personal wireless systems?(CO3) 2

2.d. Explain the concept of channel equalization using an example.(CO4) 2

2.e. Differentiate between 4G and 5G mobile technologies in terms of their features and capabilities.(CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Explain the concept of signal-to-noise ratio (SNR) and its importance in wireless communication.(CO1) 6

3-b. How does fading affect signal propagation in wireless communication, and what techniques are used to mitigate it?(CO1) 6

3-c. Describe the process of channel assignment in cellular networks.(CO2) 6

3-d. How does a cell's capacity relate to the number of available frequencies and modulation schemes?(CO2) 6

3.e. Explain the concept of fast fading in the context of mobile communication.(CO3) 6

3.f. Describe the trade-offs involved in implementing diversity in a communication system.(CO4) 6

3.g. Difference between Edge and CDMA. Explain in details(CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a.	How does multipath propagation impact wireless communication, and what techniques are used to mitigate it?(CO1)	10
4-b.	What are the key advantages of Wireless Local Loop (WLL) systems in providing last-mile connectivity?(CO1)	10

5. Answer any <u>one</u> of the following:-

5-a.	What is the fundamental concept behind cellular infrastructure in mobile communication systems?(CO2)	10
5-b.	How does interference management play a crucial role in improving system capacity?(CO2)	10

6. Answer any <u>one</u> of the following:-

6-a.	How does the choice of frequency band impact radio wave propagation in personal wireless systems?(CO3)	10
6-b.	Discuss the properties of the Rayleigh fading channel model and its relevance to wireless communication.(CO3)	10

7. Answer any <u>one</u> of the following:-

7-a.	Discuss the importance of pilot signals in Rake receivers.(CO4)	10
7-b.	Write short notes on i) Diversity Techniques ii) Multiple Access Techniques iii) Pure ALOHA (CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	Discuss the international standards and spectrum allocations associated with IMT 2000 and their implications for global mobile communication.(CO5)	10
8-b.	Write short notes on 1) GSM system for mobile Telecommunication 2) Long Term Evolution (LTE) 3) Li-Fi Communication (CO5)	10