

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VII - THEORY EXAMINATION (2024 - 2025)

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. Who is credited with making the first mobile phone call in history?(CO1,K1)

1

- (a) Alexander Graham Bell
- (b) Nikola Tesla
- (c) Martin Cooper
- (d) Thomas Edison

1-b. What is the primary purpose of a base station in a cellular system?(CO1,K1)

1

- (a) Storing subscriber data
- (b) Transmitting and receiving radio signals to and from mobile devices
- (c) Managing Wi-Fi networks
- (d) Providing GPS coordinates

1-c. Connectionless services are also called _____(CO2,K1)

1

- (a) Datagram services
- (b) Virtual circuit routing
- (c) Connection oriented services
- (d) Routing service

1-d. In ionosphere propagation, waves arriving at the receiving antenna using the phenomenon of _____(CO2,K2)

1

- (a) Scattering
- (b) Refraction

- (c) Diffraction
- (d) Radiation
- 1-e. What is the primary cause of fading in wireless communication systems?(CO3,K1) 1
- (a) Shadowing
- (b) Multipath propagation
- (c) Channel noise
- (d) Frequency interference
- 1-f. In the context of wireless communication, what is meant by "channel noise"?(CO3,K2) 1
- (a) Interference from other channels
- (b) Natural noise in the communication channel
- (c) Noise introduced by the wireless device
- (d) Noise in the power supply
- 1-g. Equalization in communication systems aims to(CO4,K2) 1
- (a) Increase signal power
- (b) Reduce noise
- (c) Compensate for channel distortion
- (d) Enhance modulation schemes
- 1-h. The primary function of a Rake receiver is to:(CO4,K1) 1
- (a) Amplify signals
- (b) Filter out noise
- (c) Exploit path diversity
- (d) Implement time-division multiplexing
- 1-i. In GSM, what is the primary modulation scheme used for data transmission?(CO5,K1) 1
- (a) Frequency Shift Keying (FSK)
- (b) Quadrature Amplitude Modulation (QAM)
- (c) Code Division Multiple Access (CDMA)
- (d) Time Division Multiple Access (TDMA)
- 1-j. Which of the following is a key feature of UMTS technology?(CO5,K2) 1
- (a) Frequency Division Multiple Access (FDMA)
- (b) Time Division Multiple Access (TDMA)
- (c) Code Division Multiple Access (CDMA)
- (d) Quadrature Amplitude Modulation (QAM)
2. Attempt all parts:-
- 2.a. Discuss the importance of low Earth orbit (LEO) satellite constellations.(CO1,K2) 2
- 2.b. Describe the purpose of a Paging Channel (PCH).(CO2,K2) 2

- 2.c. What is shadowing in wireless communication?(CO3,K1) 2
- 2.d. Explain the purpose of equalization in a wireless communication channel.(CO4,K2) 2
- 2.e. What is CDMA 2000, and how does it differ from GSM in terms of technology and operation?(CO5,K1) 2

SECTION-B 30

3. Answer any five of the following:-

- 3-a. What are some improvements in data transmission associated with 4G LTE networks?(CO1,K1) 6
- 3-b. Describe the primary purpose of paging systems in mobile communication.(CO1,K2) 6
- 3-c. How does a Base Transceiver Station (BTS) differ from a Base Station Controller (BSC) in cellular systems?(CO2,K2) 6
- 3-d. What are the advantages and disadvantages of hard handoffs in cellular networks?(CO2,K1) 6
- 3.e. What is the Additive White Gaussian Noise (AWGN) channel model?(CO3,K1) 6
- 3.f. What is a Linear Predictive Coder (LPC), and how does it work in speech compression? Explain the key stages in LPC encoding.(CO4,K1) 6
- 3.g. Describe the different generations of CDMA technology, including CDMA 2000.(CO5,K2) 6

SECTION-C 50

4. Answer any one of the following:-

- 4-a. Compare the first-generation (1G) and second-generation (2G) mobile systems in terms of technology and capabilities.(CO1,K3) 10
- 4-b. What is the role of modulation in wireless communication, and how does it affect signal transmission?(CO1,K1) 10

5. Answer any one of the following:-

- 5-a. What are the main components of a cellular infrastructure, and how do they work together?(CO2,K1) 10
- 5-b. Explain the concept of channel assignment in cellular systems and its impact on network performance.(CO2,K2) 10

6. Answer any one of the following:-

- 6-a. Explain the concept of multipath propagation and its impact on signal quality in wireless systems.(CO3,K2) 10
- 6-b. How does the bit error rate (BER) vary with SNR in Rayleigh fading channels compared to AWGN channels?(CO3,K2) 10

7. Answer any one of the following:-

- 7-a. Describe the concept of interleaving in channel coding and its importance in mitigating burst errors.(CO4,K2) 10

- 7-b. Name a widely used error-correcting code in data communication.(CO4,K2) 10
8. Answer any one of the following:-
- 8-a. How does GPRS (General Packet Radio Service) contribute to efficient packet-switched data services in GSM networks, and what are its limitations?(CO5,K2) 10
- 8-b. Explain the concept of Next-Generation Networks (NGN) in the telecommunications industry, including its architectural components and its role in enabling advanced services.(CO5,K2) 10

COP:JULY_DEC-2024