Printed page:04 **Subject Code: AEC0602**

Roll No: | | | | | | | | | | | | | | |

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI- THEORY EXAMINATION (2023-2024)

Subject: Wireless Communication Networks

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

General Instructions:

IMP: Verify that you have received question paper with 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. The portion of physical layer that interfaces with the media access control sublayer is called: (CO1) 1

(a) Physical signalling sublayer

(b) Physical data sublayer

(c) Physical address sublayer

(d) Physical transport sublayer

1-b. Automatic repeat request error management mechanism is provided by: (CO1) 1

(a) Logical link control sublayer

(b) Media access control sublayer

(c) Network interface control sublayer

(d) Application access control sublayer

1-c. Which of the following internet service is appropriate to access the computer of your office from home? (CO2) 1

(a) WWW

(b) IRC

(c) FTP

(d) Telnet

1-d. What is the port number of HTTP ? (CO2) 1

(a) 80

(b) 20/21

(c) 25

(d) All of the above

1-e. Which of the following system is a 3G system? (CO3) 1

(a) Analog cellular system

(b) EDGE

(c) FM

(d) UMTS

1-f. Which of the following is not a part of the characteristic of 4G network? (CO3) 1

(a) Multirate management

(b) Fully converged services

(c) Software dependency

(d) Diverse user

1-g. Which of the following parts in SDR is hardware? (CO4) 1

(a) Modulator

(b) ADC/DAC

(c) Beam-forming controller

(d) Waveform generator

1-h. Which of the following statement is true? (CO4) 1

(a) The OFDMA provides of frequency diversity and out-of-cell interference.

(b) The OFDMA provides the code sequences, which are orthogonal.

(c) The OFDMA is wideband and hence least spectrally efficient.

(d) The OFDMA is nothing but FDMA.

1-i. In which of the following random access methods, the best performance is obtained? 1

(a) ALOHA (CO5)

(b) Slotted ALOHA

(c) 1-persistent CSMA

(d) Non-persistent CSMA

1-j. In which of the following multiple access schemes, a user can use only a part of the total bandwidth? 1 (CO5)

(a) TDMA

(b) FDMA

(c) CDMA

(d) SDMA

2. Attempt all parts:-

2.a.	What are different framing methods?	(CO1)	2
2.b.	Compare the TCP and UDP protocols.	(CO2)	2
2.c.	What do you mean by 2G and 3G for wireless communication?	(CO3)	2
2.d.	What are the objective and characteristics of wireless sensor networks?	(CO4)	2
2.e.	Prove that the OFDMA is more spectrally efficient than FDMA.	(CO5)	2

SECTION – B 30

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

3-a.	Explain in detail different layers in OSI reference model.	(CO1)	6
3-b.	Compare the Hub, Repeater, Bridge, Switch, and Router with clear explanation.	(CO1)	6
3-c.	Give the brief introduction of IPv6 and IPv4 addressing with example and draw the format figure of IPv6 diagram.	(CO2)	6
3-d.	Write down the responsibilities of transport layer in details.	(CO2)	6
3-e.	Differentiate between the following terms: (i)- Fast fading and slow fading (ii)- Frequency-selective fading and flat fading	(CO3)	6
3-f.	Explain the term IOT spectrum sharing and its importance.	(CO4)	6
3-g.	What are the advantages of reservation schemes? How are collisions avoided during data transmission? Why is the probability of collisions lower compared to classical ALOHA? What are the disadvantages of reservation schemes?	(CO5)	6

SECTION – C 50

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

4-a.	Explain difference between stop and wait protocol and sliding window protocol in details with suitable example and neat diagrams.	(CO1)	10
4-b.	Explain the operation of the bit-oriented protocol HDLC with the required frames.	(CO1)	10

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

5-a.	Explain why a DNS is required with the internet and describe its main functional parts. In relation to DNS, explain why hierarchical naming structure is used instead of a flat structure?	(CO2)	10
5-b.	Differentiate between static and dynamic routing with their pros and cons. Give example of some routing protocols used in both type of routing.	(CO2)	10

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

6-a.	Explain the Evolved Packet Core architecture (EPC) of LTE by make use of basic radio and network components with neat diagrams. (CO3)	10
6-b.	Explain the evolution of mobile phone from 1G to 5G. (CO3)	10
7.	Answer any <u>one</u> of the following-	
7-a.	Describe the frequency reuse techniques in allocating channel groups of base stations within a system. Derive the equation for co-channel interference in cellular system. Find out the co-channel interference at the desired base station (cell site) if N=7 cell pattern. (CO4)	10
7-b.	Explain D2D architecture for communication in cellular network with suitable diagrams. (CO4)	10
8.	Answer any <u>one</u> of the following-	
8-a.	Compare the delay of pure ALOHA to slotted ALOHA at low load. An ALOHA network user 19.2 kbps channel for sending message packets of 100 bit long size. Calculate the maximum throughput for pure ALOHA network. (CO5)	10
8-b.	Explain in details the design challenges in Ad-hoc wireless networks. How the security and energy constrained of the networks can be improved ? (CO5)	10