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 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. Application layer offers _____ service. (CO1) 1

(a) End to end

(b) Process to process

(c) Both End to end and Process to process

(d) None of the mentioned

1-b. Electronic mail uses which Application layer protocol? (CO1) 1

(a) SMTP

(b) HTTP

(c) FTP

(d) SIP

1-c. The size of an IP address in IPv6 is _____. (CO2) 1

(a) 4 bytes

(b) 128 bits

(c) 8 bytes

(d) 100 bits

1-d. Hub work on which layer of OSI model? (CO2) 1

(a) Physical layer

(b) Data Link layer

(c) Network layer

(d) None

1-e. Which cellular system was introduced as a second-generation (2G) technology? (CO3) 1

(a) CDMA
(b) GSM
(c) AMPS
(d) TACS

1-f. What is the definition of fading in wireless communication? (CO3) 1

(a) The loss of signal strength due to distance
(b) The loss of signal strength due to attenuation
(c) The variation of signal strength over time or distance
(d) The distortion of the signal due to interference

1-g. Which of the following is a benefit of using small cells in wireless communication? (CO4) 1

(a) Increased network capacity
(b) Lower power consumption
(c) Reduced interference
(d) All of the these

1-h. What is multicarrier modulation technique in wireless communication? (CO4) 1

(a) A technique that uses multiple carriers to transmit data
(b) A technique that uses a single carrier to transmit data
(c) A technique that enhances the quality of received signals
(d) A technique that reduces the number of errors in a transmission

1-i. A signal in which 1 bit lasts 0.001 s, the Bit rate would be. (CO5) 1

(a) 1Kbps
(b) 500bps
(c) 50bps
(d) 1700bps

1-j. What is the type of network in which the topology changes from time to time? (CO5) 1

(a) Wi-Fi
(b) Cell Network
(c) LAN
(d) MANET

2. Attempt all parts:-

2.a. How does the Data Link layer differ from the Physical layer? (CO1) 2

2.b. What are the protocols used at the network layer? (CO2) 2

2.c. What is carrier aggregation in LTE 4G Advanced? (CO3) 2

2.d.	What are the challenges of implementing D2D communication in IoT networks? (CO4)	2
2.e.	Differentiate between Infrastructure networks and Adhoc Wireless Networks.(CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What are some common error detection and correction techniques used in the data link layer? Explain. (CO1)	6
3-b.	What is the difference between a MAC address and an IP address? (CO1)	6
3-c.	What are the problems encountered during releasing a connection in transport layer? Give some solution applicable to it. (CO2)	6
3-d.	What is the difference between a router and a switch in the network layer? (CO2)	6
3.e.	Explain the factor influencing small scale fading. (CO3)	6
3.f.	What is OFDM (Orthogonal Frequency Division Multiplexing)? (CO4)	6
3.g.	Explain the following Multiple Access Techniques used to access the channel by mobile subscriber. (CO5) 1-Frequency Division Multiple access. 2-Code Division Multiple access.	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	What are the half duplex and full duplex transmissions used in the data link layer? Explain the mechanism with suitable diagrams.(CO1)	10
4-b.	What is the difference between the OSI model and the TCP/IP model? (CO1)	10

5. Answer any one of the following:-

5-a.	What is fragmentation? Why do we need it? Discuss pros and cons of transparent and non-transparent fragmentation. (CO2)	10
5-b.	Give the brief introduction of IPV6 AND IPV4 addressing with example and draw the format figure of IPV6 diagram. (CO2)	10

6. Answer any one of the following:-

6-a.	What is the Sequence Control field in an IEEE 802.11 MAC frame? (CO3)	10
6-b.	How did the mobile phone evolve from 1G to 5G? (CO3)	10

7. Answer any one of the following:-

7-a.	What is the difference between licensed and unlicensed spectrum in Cognitive Radio? Explain. (CO4)	10
7-b.	How does Doppler shift affect the performance of wireless communication systems? (CO4)	10

8. Answer any one of the following:-

8-a.	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. How does CSMA work in wireless networks, and what are the different variants of CSMA, such as 1-persistent CSMA, non-persistent CSMA, and p-persistent CSMA? (CO5) 10