Printed Page:- 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 (20.. - 20....)

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. Which one is not an application layer protocol? (CO1, K1) 1

(a) HTTP

(b) SMTP

(c) FTP

(d) TCP

1-b. The HTTP request message is sent in _____ part of three-way handshake. (CO1, K2) 1

(a) First

(b) Second

(c) Third

(d) Fourth

1-c. The header length of an IPv6 datagram is _____. (CO2, K1) 1

(a) 10 bytes

(b) 25 bytes

(c) 30 bytes

(d) 40 bytes

1-d. In open-loop control, policies are applied to _____. (CO2, K2) 1

(a) Remove after congestion occurs

(b) Remove after sometime

(c) Prevent before congestion occurs

(d) Prevent before sending packets

1-e. Which type of fading occurs due to the movement of the transmitter or receiver? (CO3, K2) 1

(a) Rayleigh fading

(b) Rician fading

(c) Doppler fading

(d) Slow fading

1-f. Which generation of cellular systems introduced digital voice communication? (CO3, K1) 1

(a) 2G

(b) 1G

(c) 3G

(d) 4G

1-g. Which of the following is NOT a factor that affects the performance of small cells? (CO4, K2) 1

(a) Traffic load

(b) Backhaul capacity

(c) Network topology

(d) Wi-Fi standards

1-h. Which of the following is an advantage of OFDM over single-carrier modulation? (CO4, K1) 1

(a) Higher data rate

(b) Better performance in multipath environments

(c) Lower power consumption

(d) All of the these

1-i. A file contains 2 million bytes. How long does it take to download this file using a 56-Kbps channel? (CO5, K3) 1

(a) 1-2 mins

(b) 5-6 mins

(c) 2-4 mins

(d) 7-8 mins

1-j. A channel has a 1-MHz bandwidth. The SNR for this channel is 63. What is the appropriate signal level? (CO5, K3) 1

(a) 2

(b) 8

(c) 4

(d) 16

2. Attempt all parts:-

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2.a.	How does the Presentation layer handle data formatting and encryption? (CO1, K2)	2
2.b.	What is flow control and how does it work at the transport layer? (CO2, K1)	2
2.c.	How does LTE 4G Advanced differ from regular LTE 4G? (CO3, K1)	2
2.d.	How does MIMO differ from traditional wireless communication systems? (CO4, K2)	2
2.e.	What is soft handoff? (CO5, K1)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What is the role of error detection and correction in the physical layer? Explain. (CO1, K2)	6
3-b.	What is framing, and how does it work in the data link layer? (CO1, K3)	6
3-c.	What are the problems encountered during releasing a connection in transport layer? Give some solution applicable to it. (CO2, K2)	6
3-d.	Explain the role of the Dynamic Host Configuration Protocol (DHCP) in the network layer with some suitable examples. (CO2, K2)	6
3.e.	How did 4G networks improve upon 3G networks? Explain. (CO3, K1)	6
3.f.	What is dynamic spectrum access in the context of IoT spectrum sharing? Explain. (CO4, K2)	6
3.g.	A cellular system uses FDMA with spectrum allocation of 12.5 MHz in each direction, a guard band at the edge of the allocated spectrum of 10 KHz, and a channel bandwidth of 30 KHz. Find out number of channels available. (CO5, K3)	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, K2)	10
4-b.	What is the function of the session layer? Also, explain the difference between the OSI model and the TCP/IP model. (CO1, K2)	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, K3)	10
5-b.	What is the importance of flow control and congestion control in the transport layer? Explain the relationship between the transport layer and the application layer. (CO2, K2)	10

6. Answer any one of the following:-

6-a.	What are the different types of fading? How does fading affect the performance of wireless communication system? (CO3, K2)	10
6-b.	What is the function of the Frame Control field in an IEEE 802.11 MAC frame? Explain. (CO3, K3)	10

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

7-a.	How does MCM differ from single-carrier modulation? Also, explain the working of OFDM in MCM. (CO4, K2)	10
7-b.	What is the role of multiple-input multiple-output (MIMO) in smart antennas? How does beamforming improve the performance of smart antennas? (CO4, K2)	10

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

8-a.	A group of N stations share a 56-kbps pure ALOHA channel. Each station outputs a 1000-bit frame on average once every 100 sec, even if the previous one has not yet been sent. What is the maximum value of N? How does carrier sense multiple access with collision avoidance (CSMA/CA) work. (CO5, K3)	10
8-b.	What are the different types of multiple access techniques used in wireless communication, and how do they differ from each other in terms of their features and performance? (CO5, K2)	10

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