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Printed Page:-4 **Subject Code:- ACSE0502**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: V - THEORY EXAMINATION (2025 - 2026)
Subject: Computer 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. In TDM, slots are further divided into _____. (CO1, K1) 1

(a) Seconds
(b) Frames
(c) Packets
(d) None of the above

1-b. Data communication system within a building or campus is_____. (CO1, K1) 1

(a) World area network
(b) Wide area network
(c) Web area network
(d) Web access network

1-c. In the _____ Protocol, the sender sends its frames one after another with no regard to the receiver. (CO2, K1) 1

(a) Simplest
(b) Selective-Repeat ARQ
(c) Stop-and-Wait
(d) Go-Back-N ARQ

1-d. CRC uses (CO2,K1) 1

(a) Multiplication
(b) Binary division
(c) Multiplication & Binary division
(d) None of the mentioned

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1-e. What is the size of an IPv4 address? (CO3,K1) 1

(a) 32 bits
(b) 64 bits
(c) 128 bits
(d) 16 bits

1-f. How many IP addresses are available in a subnet with a subnet mask of 255.255.255.192? (CO3,K1) 1

(a) 256 addresses
(b) 64 addresses
(c) 32 addresses
(d) 62 addresses

1-g. Discuss the main purpose of connection management in TCP? (CO4, K2) 1

(a) To manage network congestion
(b) To establish, maintain, and terminate connections between applications
(c) To ensure data is encrypted
(d) To perform error checking

1-h. What happens when TCP detects a lost packet? (CO4, K1) 1

(a) The packet is deleted from the buffer.
(b) The sender retransmits the packet.
(c) The receiver ignores the lost packet.
(d) The packet is stored and sent later.

1-i. DNS translate does_____. (CO5, K1) 1

(a) IP addresses to domain names
(b) Domain names to IP addresses
(c) URLs to email addresses
(d) HTTP requests to HTTPS

1-j. Which is not a application layer protocol? (CO5, K1) 1

(a) HTTP
(b) SMTP
(c) FTP
(d) TCP

2. Attempt all parts:-

2.a. Assume 6 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? (CO1, K3) 2

2.b. Discuss single bit error and multiple bit error. (CO2, K2) 2

2.c. Explain the purpose of ARP. (CO3, K2) 2

2.d. Discuss the functionality of UDP. (CO4, K2) 2

2.e. Compare the working of HTTP and FTP. (CO5, K2) 2

SECTION-B 30

3. Attempt all parts:-

3.a. Answer any one of the following:-

3.a.(i)	Explain the components of computer networks. (CO1, K2)	6
3.a.(ii)	List the key differences between circuit switching, packet switching, and message switching, and in what scenarios is each technique most effective for optimizing network performance. (CO1, K4)	6

3.b. Answer any one of the following:-

3.b.(i)	Summarize Stop and wait protocol with its advantages and disadvantages. (CO2, K2)	6
3.b.(ii)	Find the CRC codeword for the given generator polynomial x3 +1 when data is 11001001. (CO2, K3)	6

3.c. Answer any one of the following:-

3.c.(i)	Define flow control? Also illustrate how TCP implement flow control? (CO3, K3)	6
3.c.(ii)	Describe the process of packet fragmentation and reassembly in IPv4. When is fragmentation necessary? (CO3, K2)	6

3.d. Answer any one of the following:-

3.d.(i)	Explain three-way handshaking in detail, and why is it necessary for TCP connection establishment? (CO4, K2)	6
3.d.(ii)	How does TCP avoid congestion in networks, and what strategies are used in 'congestion avoidance'? (CO4, K2)	6

3.e. Answer any one of the following:-

3.e.(i)	(a) Define Cryptography. Write the features and applications of cryptography. (b) Differentiate between Symmetric and Asymmetric key Cryptography. (CO5, K2)	6
3.e.(ii)	Discuss in detail about DNS and its domain. (CO5, K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Discuss different types of data transferring modes through networks? (CO1, K2)	10
4-b.	Explain all the types of network topology with its merits and demerits. (CO1, K2)	10

5. Answer any one of the following:-

5-a.	(a) Compare Pure ALOHA with slotted ALOHA protocol. (b) Explain in detail about Controlled access protocols in computer networks. (CO2, K3)	10
5-b.	Discuss various error correction techniques. Construct the Hamming code for data 1011 using even parity. (CO2, K3)	10

6. Answer any one of the following:-

6-a.	Describe static routing and outline the manual configuration steps on a router. Compare their advantages and disadvantages with dynamic routing methods. (CO3,K2)	10
6-b.	Discuss the challenges of congestion control in connectionless protocols (e.g., UDP). (CO3, K2)	10

7. Answer any one of the following:-

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7-a.	(a) Describe QoS in networking and identify the main QoS parameters used for traffic management. (b) Compare Transmission Control Protocol (TCP) with User Datagram Protocol (UDP). (CO4, K2)	10
7-b.	Compare and contrast the congestion control mechanisms in TCP (e.g., slow start, congestion avoidance, fast recovery) and how they impact overall network performance. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	Discuss various data compression techniques. Also discuss how lossy compression is different from lossless compression. (CO5, K3)	10
8-b.	Explain the following terms:(CO5, K2) 1. SMTP 2. VPN 3. WWW	10