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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - THEORY EXAMINATION (2024 - 2025)

Subject: Computer Network

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, K2,K6) 1
- (a) Seconds
- (b) Frames
- (c) Packets
- (d) None of the above
- 1-b. Message switching techniques use the principle of _____. (CO1, K2,K6) 1
- (a) Stop and Wait
- (b) Store and Forward
- (c) Both Stop and Wait and Store and Forward
- (d) None of these
- 1-c. Both Go-Back-N and Selective-Repeat Protocols use a _____. (CO2, K2, K6) 1
- (a) sliding window
- (b) sliding frame
- (c) sliding packet
- (d) none of the above
- 1-d. Why do we require hamming codes? (CO2, K2, K6) 1
- (a) Error correction
- (b) Encryption only
- (c) Decryption

- (d) Bit stuffing
- 1-e. Supernetting found in which type of IP addresses: (CO3, K3, K4, K6) 1
- (a) Classfull
 - (b) Classless
 - (c) Both A & B
 - (d) None
- 1-f. Main function of network layer of OSI model is (CO3, K3, K4, K6) 1
- (a) Routing
 - (b) Logical addressing
 - (c) Both A & B
 - (d) None
- 1-g. Which of the following is NOT true for UDP? (CO4, K2, K4) 1
- (a) It is connectionless.
 - (b) It guarantees reliable data delivery.
 - (c) It uses port numbers for process-to-process communication.
 - (d) It has a smaller header size than TCP.
- 1-h. What does QoS (Quality of Service) refer to? (CO4, K2, K4) 1
- (a) The speed of the network connection
 - (b) The reliability of a network's hardware
 - (c) The ability to prioritize different types of traffic and ensure performance requirements are met
 - (d) The number of users connected to the network
- 1-i. If you have to send multimedia data over SMTP it has to be encoded into _____ (CO5, K2) 1
- (a) Binary
 - (b) Signal
 - (c) ASCII
 - (d) Hash
- 1-j. The time taken by a packet to travel from client to server and then back to the client is called _____. (CO5, K2) 1
- (a) STT
 - (b) RTT
 - (c) PTT
 - (d) JTT
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, K2, K6) 2
- 2.b. Write about the services provided by the Data link layer. (CO2, K2, K6) 2

- | | | |
|------|---|---|
| 2.c. | Find the class of the network if the address is 221.46.75.64. (CO3, K3, K4, K6) | 2 |
| 2.d. | Explain process-to-process delivery? (CO4, K2, K4) | 2 |
| 2.e. | Illustrate the basic working of electronic mail. (CO5, K2) | 2 |

SECTION-B

30

3. Answer any five of the following:-

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|------|--|---|
| 3-a. | Explain different guided and unguided media with suitable diagram. (CO1, K2, K6) | 6 |
| 3-b. | 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, K2, K6) | 6 |
| 3-c. | Explain Selective Repeat ARQ method with its advantages and disadvantages. (CO2, K2, K6) | 6 |
| 3-d. | Find the CRC codeword for the given generator polynomial $x^3 + 1$ when data is 11001001. (CO2, K2, K6) | 6 |
| 3.e. | Consider the effect of using slow start on a line with a 10 msec RTT and no congestion. The receiver window is 24 KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent? (CO3, K3, K4, K6) | 6 |
| 3.f. | Explain three-way handshaking in detail, and why is it necessary for TCP connection establishment? (CO4, K2, K4) | 6 |
| 3.g. | (a) Define Cryptography. Write the features and applications of cryptography.
(b) Differentiate between Symmetric and Asymmetric key Cryptography. (CO5, K2) | 6 |

SECTION-C

50

4. Answer any one of the following:-

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|------|--|----|
| 4-a. | Explain different protocols which works on different layers of TCP/IP model. (CO1, K2, K6) | 10 |
| 4-b. | (a) Explain different types of transmission Modes in computer networks?
(b) Compare LAN, MAN, WAN, PAN and VPN. (CO1, K2, K6) | 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, K2, K6) | 10 |
| 5-b. | Define and explain the CSMA (Carrier Sense Multiple Access) protocol. Discuss both CSMA/CD and CSMA/CA protocols with diagrams, focusing on how they manage collisions and ensure fair channel access. (CO2, K2, K6) | 10 |

6. Answer any one of the following:-

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|------|---|----|
| 6-a. | Explain the difference between IPv4 and IPv6 addressing schemes. Why has IPv6 been introduced, and how does it address the limitations of IPv4 in the context of internetworking? (CO3, K3, K4, K6) | 10 |
|------|---|----|

- 6-b. (a) Differentiate between DHCP and ICMP internetworking with diagram. 10
(b) Explain the implementation of Leaky Bucket and Token Bucket congestion control Algorithm with diagram. (CO3, K3, K4, K6)
7. Answer any one of the following:-
- 7-a. (a) Describe QoS in networking and identify the main QoS parameters used for traffic management. 10
(b) Compare Transmission Control Protocol (TCP) with User Datagram Protocol (UDP). (CO4, K2, K4)
- 7-b. (a) Describe Window size in TCP. Explain how the window size in TCP can be dynamically adjusted to optimize throughput in a variable network environment. 10
(b) List the advantages of connection oriented system over connectionless system. (CO4, K2, K4)
8. Answer any one of the following:-
- 8-a. Explain the role of data compression in computer networks, and how does it impact bandwidth utilization and transmission efficiency? Provide examples of common compression algorithms used in networking. (CO5, K2) 10
- 8-b. (a) Discuss the role and functionality of the Domain Name System (DNS) in the context of the Internet. 10
(b) List the features of HTTP and explain how HTTP works. (CO5, K2)

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