

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK

**Subject Name & Code:**  
**COMPUTER NETWORKS (3161007)**

---

## Unit 1: Introduction to Data Communication and Networking

### Repeated Questions:

1. **Compare OSI model vs. TCP/IP model.** (W24 - Q1b, 04 Marks) (S25 - Q2a, 03 Marks) (W22 - Q1a, 03 Marks)
2. **Draw and explain ISO OSI reference model.** (S23 - Q1c, 07 Marks) (S24 - Q2c, 07 Marks) (W25 - Q1c, 07 Marks)
3. **List out and explain various network topologies.** (S23 OR Q2c, 07 Marks) (S24 - Q1c, 07 Marks) (W22 - Q1c, 07 Marks) (W23 - Q1c, 07 Marks) (S25 OR Q2c, 07 Marks) (W24 - Q3c, 07 Marks)

### Other Important Questions:

1. Which of the OSI layers handles each of the following: i) Dividing the message into segments. ii) Determining which route through the subnet to use. iii) Dividing the transmitted bit stream into frames. (W25 - Q1a, 03 Marks)
2. Explain Local Area Network (LAN). (S23 - Q1a, 03 Marks) (S25 - Q1a, 03 Marks)
3. Explain the terms: LAN, MAN, WAN. (S22 - Q1a, 03 Marks)
4. What is Computer Network? List out few uses of Computer Networks. (W24 - Q1a, 03 Marks)
5. List out types of addresses used in TCP/IP model with one example. (S24 - Q1a, 03 Marks)
6. Define protocol and interface. (W23 - Q1a, 03 Marks)
7. List two ways in which OSI reference model and TCP/IP reference model are the same. (W23 - Q1b, 04 Marks)
8. What are two reasons for using layered protocols? (W23 - Q2a, 03 Marks)
9. Which of the OSI layers handles each of following: 1. Dividing the transmitted bit stream into frames. 2. Determining which route through the subnet to use. (W23 - Q2b, 04 Marks)
10. List out few design issues for the layers. (W24 - Q2a, 03 Marks)

## Unit 2: Physical Layer

### Repeated Questions:

1. **Classify and explain Transmission Media.** (S24 - Q2c, 07 Marks) (W24 - Q1c, 07 Marks) (S25 - Q2c, 07 Marks)
2. **Compare Circuit Switching vs. Packet Switching.** (S23 - Q3b, 04 Marks) (S24 - Q3b, 04 Marks) (W22 - Q3b, 04 Marks) (W24 - Q3b, 04 Marks) (S25 - Q2b, 04 Marks)

### Other Important Questions:

1. What is the physical layer in OSI model responsible for? Which protocol is used in physical layer. (S22 - Q2b, 04 Marks)
2. Classify transmission media. Explain any one guided transmission media. (S24 - Q1b, 04 Marks)
3. Compare Connection oriented vs. Connection less service. (S24 - Q2a, 03 Marks)
4. Compare: Connection-Oriented Services vs. Connection-Less Services (W24 - Q2b, 04 Marks)
5. Explain the need for physical layer. (W24 - Q1c, Part of 07 Marks)
6. Explain Point-to-Point and Multipoint connections / links with necessary diagrams. (W22 - Q2a, 03 Marks)
7. Differentiate between message switching and packet switching. (W23 OR Q3a, 03 Marks)
8. What is the difference between unicast, multicast and broadcast addresses? (W23 - Q4a, 03 Marks)
9. Give comparison between packet switching and circuit switching. (S22 - Q2a, 03 Marks)

### Unit 3: Data Link Layer

**Repeated Questions:**

1. **Explain HDLC protocol.** (S23 - Q3c, 07 Marks) (S22 - Q2c, 07 Marks) (S25 - Q3c, 07 Marks)
2. **What is Framing? List out and explain various framing techniques.** (S24 - Q3c, 07 Marks) (S22 OR Q3c, 07 Marks)
3. **Explain Sliding Window Protocol.** (S22 OR Q2c, 07 Marks) (S22 - Q3c, 07 Marks) (S25 OR Q3a, 03 Marks)

**Other Important Questions:**

1. Explain Flow Control and Error Control. (S23 - Q3a, 03 Marks)
2. Explain bit stuffing. (S23 OR Q3a, 03 Marks)
3. What is ARQ? Compare link layer ARQ protocols. (S23 OR Q3b, 04 Marks)
4. Compare Go Back N ARQ vs. Selective Repeat ARQ (S24 - Q3a, 03 Marks)
5. Compare Error detection vs. Error correction. (S24 OR Q3a, 03 Marks)
6. Explain Sliding window protocol with an example. (S24 OR Q3b, 04 Marks)
7. What is Automatic Repeat Request (ARQ)? Explain Stop and Wait ARQ in detail with an example. (S24 OR Q3c, 07 Marks)
8. What is Sliding Window Protocol? What do you mean by ARQ? Explain Selective repeat ARQ in detail. (W22 - Q3c, 07 Marks)
9. What is Framing? Explain byte stuffing technique. (W22 OR Q3a, 03 Marks)
10. What are Error Detection and Error Correction? Explain any one method in detail. (W22 OR Q3b, 04 Marks)
11. Give the usage of I, S, U frames of HDLC frames. (W23 OR Q3b, 04 Marks)
12. Draw and explain the flow chart/algorithm to calculate a traditional checksum. (W23 OR Q3c, 07 Marks)
13. Write note on sliding window protocol. (S22 OR Q2c, 07 Marks)
14. Explain the concept of piggybacking. (S22 - Q3b, 04 Marks)
15. List all methods used for framing and discuss any two methods used for framing. (S22 OR Q3c, 07 Marks)
16. Explain the Go Back N protocol. (S22 OR Q3b, 04 Marks)
17. What is sliding window protocols? For what purpose this protocol is used? What are the advantages of sliding window protocol? (S22 OR Q3c, 07 Marks)
18. Discuss bit stuffing and unstuffing in detail. (S25 - Q3a, 03 Marks)
19. Explain Go-Back-N ARQ. (S25 - Q3b, 04 Marks)
20. Explain Stop & Wait ARQ in detail. (W24 OR Q2c, 07 Marks)
21. Explain the terms: Unicasting, Multicasting and Broadcasting (W24 OR Q3a, 03 Marks)
22. What is Header? What type information Header carry? Also explain need for Header. (W24 OR Q3b, 04 Marks)
23. Explain need for framing. Discuss byte stuffing and unstuffing in detail. (W24 OR Q3c, Part of 07 Marks)

## Unit 4: Medium Access Layer

### Repeated Questions:

1. **Explain Pure ALOHA and Slotted ALOHA.** (S24 - Q4c, 07 Marks) (S25 OR Q3c, 07 Marks)
2. **Compare Pure ALOHA and Slotted ALOHA.** (W23 - Q3b, 04 Marks)

### Other Important Questions:

1. Classify multiple Access Protocols. Explain Pure ALOHA and Slotted ALOHA with necessary diagrams. (S23 OR Q3c, 07 Marks)
2. What do you mean by random access protocols? Explain slotted ALOHA in brief. (W25 OR Q3b, 04 Marks)
3. What do you mean by Collision? Classify Multiple Access Protocols. Explain CSMA/CD protocol in detail. (W22 OR Q3c, 07 Marks)
4. Explain CSMA/CD protocol (W25 OR Q3a, 03 Marks)
5. Write down the functions of MAC layer. (W23 OR Q3a, 03 Marks)
6. Differentiate between FDMA, TDMA and CDMA. (W23 - Q3c, 07 Marks)
7. Give comparison between CSMA/CA and CSMA/CD (S22 - Q3a, 03 Marks)
8. Justify that how slotted ALOHA is better than pure ALOHA. (S22 OR Q3a, 03 Marks)
9. Give comparison between 1- persistent and P- persistent CSMA. (S22 - Q5b, 04 Marks)
10. Discuss channel allocation problem. (S25 OR Q3c, Part of 07 Marks)
11. Discuss issues of channel allocation. Explain the static and dynamic channel allocation scheme. (S24 - Q4a, 03 Marks)
12. Explain CSMA/CA protocol with necessary diagrams. (S23 OR Q4c, 07 Marks)

## Unit 5: Local Area Network

### Repeated Questions:

1. **Explain Hub, Bridge, Switch and Router.** (S25 - Q4b, 04 Marks) (W24 - Q4a, 03 Marks)
2. **Explain Bluetooth technology.** (S23 OR Q4c, 07 Marks) (S25 OR Q4b, 04 Marks)

### Other Important Questions:

1. Explain LAN in detail. (S24 - Q2b, 04 Marks)
2. Explain functionality of Repeater, HUB, Bridge, Switch, Router and Gateway (W25 - Q2a, 03 Marks)
3. Explain following terms: 1) Repeater 2) Router 3) Bridges 4) Gateway (S22 - Q1b, 04 Marks)
4. Classify and explain various Ethernet Technologies and Standards. (W22 OR Q2c, 07 Marks)
5. Explain functioning of Hub, Switch, Bridge and Router. (S24 OR Q4b, 04 Marks)
6. Write a note on Ethernet Technology. (S24 OR Q4c, 07 Marks)
7. Write a short note on Ethernet technology. (S25 OR Q3b, 04 Marks)
8. How Bluetooth works? Explain Bluetooth architecture. (S22 - Q4a, 03 Marks)
9. Write down features & characteristic of ZigBee. (W23 - Q4b, 04 Marks)
10. Discuss the fields of Ethernet frames in brief. (W23 - Q4c, 07 Marks)
11. Draw and explain Wireless LAN in detail. (W24 - Q4b, 04 Marks)
12. Explain Pure ALOHA with necessary diagrams. (W24 OR Q4b, 04 Marks)
13. List down drawbacks of Wi- Fi. (W23 - Q5a, 03 Marks)
14. Explain the differences between 10 base 2 and 10 base 5 Ethernet. (W25 - Q3b, 04 Marks)

## Unit 6: Network Layer

### Repeated Questions:

1. **What is Routing? Explain any one routing algorithm in detail.** (S24 - Q5c, 07 Marks)  
(W24 OR Q4c, 07 Marks)
2. **What is IP address? Explain various classes of IP addresses with example.** (S25 OR Q4c, 07 Marks) (W24 - Q4a, Part of 03 Marks)

### Other Important Questions:

1. Explain Distance vector routing algorithm in detail. (S22 - Q4c, 07 Marks)
2. Explain the problem of Count-to-infinity with example in distance vector routing algorithm. (W25 OR Q2c, 07 Marks)
3. Explain Link State routing algorithm. (W22 OR Q4b, 04 Marks)
4. Explain link state routing algorithm with example in brief. (W25 - Page 2, Q3a, 03 Marks)
5. Explain Subnetting and Flooding. (S24 OR Q4b, 04 Marks)
6. What is flooding? Give its advantages and applications? (S22 - Page 2, Q5a, 03 Marks)
7. Explain the basic concept of flooding. (W25 OR Q3c, 07 Marks)
8. Explain NAT (Network Address Translation) as a solution to IP address depletion problem. (W25 - Q4a, 03 Marks)
9. Write a short note on Network classes. What is the use of subnetting in assigning IP address? (W25 - Q4c, 07 Marks)
10. Illustrate the Scenarios for establishing a connection using a Three-Way Handshake. (W25 OR Q4a, 03 Marks)
11. Compare IPv4 and IPv6. (W25 OR Q4b, 04 Marks)
12. Explain leaky bucket algorithm for the network traffic shaping (W25 OR Q4c, 07 Marks)
13. What is the need of IP address? What is classful and classless IP address? (S22 OR Q4b, 04 Marks)
14. Explain IPv4 header fields with necessary diagrams. (S22 OR Q4c, 07 Marks)
15. Explain Classful and Classless IPV4 addressing schemes with examples. (W22 OR Q4c, 07 Marks)
16. Draw and explain IPV4 header. (S23 OR Q4b, 04 Marks)
17. Explain Classful IP addressing scheme. (S23 OR Q4a, 03 Marks)
18. What is Congestion? Classify congestion control algorithms. (S25 - Q4a, 03 Marks)
19. What do you mean by Congestion? Classify congestion control algorithms. (W22 - Q4a, 03 Marks)
20. Write down Optimality principle. Explain it with the help of an example. (W23 OR Q4b, 04 Marks)
21. Compare: Datagram and virtual circuit subnets. (W23 OR Q4c, 07 Marks)
22. How to do congestion control in Virtual circuit subnets, explain with the help of an example? (W23 OR Q5c, 07 Marks)
23. Give an argument why the leaky bucket algorithm should allow just one packet per tick, independent of how large the packet is. (W23 OR Q4a, 03 Marks)
24. What is the role of routing algorithms at network layer? (S22 - Q4c, Part of 07 Marks)
25. Give comparison between X.25 network and Frame relay. (S22 OR Q4a, 03 Marks)
26. Draw and explain about IP addressing in detail. (W24 - Q4a, 03 Marks)
27. Explain Shortest path algorithm in detail. (S25 - Q4c, 07 Marks)

## Unit 7: Transport Layer

### Repeated Questions:

1. **Compare TCP vs. UDP.** (S23 OR Q4b, 04 Marks) (S24 - Q5b, 04 Marks) (S25 OR Q4a, 03 Marks) (W22 - Page 2, Q3a, 03 Marks) (S22 - Q5a, 03 Marks)
2. **Explain TCP Header.** (S23 - Q5b, 04 Marks) (S25 OR Q5b, 04 Marks) [*Note: S25 asks to "Draw and explain IPV4 header", which is Unit 6. This repetition is for TCP Header.*]

### Other Important Questions:

1. Define: Connection- Less Service, Connection- Oriented Service, Acknowledged Service and Unacknowledged Service. (S23 - Q2b, 04 Marks)
2. Draw and explain data delivery from Hop to Hop, Source host to Destination host, and Process to Process. (S23 - Q2a, 03 Marks)
3. Explain: Hop to Hop delivery, Source to Destination delivery and Process to Process delivery (W22 - Q3a, 03 Marks)
4. Briefly explain types of addresses used at Host to Network Layer, IP Layer, Transport Layer and Application Layer of TCP/IP model. (W22 - Q2b, 04 Marks)
5. What is Process to Process communication? Explain how transport layer performs it. (W24 - Q5a, 03 Marks)
6. Explain User Datagram Protocol in detail. (W24 OR Q5b, 04 Marks)
7. Draw neat sketch of connection establishment and connection termination used in TCP with necessary flags. (W22 OR Q4a, 03 Marks)
8. Give differences between Frame, Packet and TPDU. How encapsulation is done? (S22 - Q4b, 04 Marks)

## Unit 8: Application Layer

### Repeated Questions:

1. **Explain Domain Name System (DNS).** (S23 - Q5c, 07 Marks) (S24 OR Q5c, 07 Marks) (S25 - Q5c, 07 Marks) (W24 OR Q5c, 07 Marks)
2. **Explain HTTP / Write a note on HTTP.** (S24 OR Q5a, 03 Marks) (S25 OR Q5b, 04 Marks) (W24 - Q5b, 04 Marks) (W25 - Q3a, 03 Marks)
3. **Explain RSA algorithm.** (S24 OR Q5b, 04 Marks) (W25 - Page 2, Q3b, 04 Marks)
4. **What is Cryptography? List out various ciphers.** (S23 OR Q5a, 03 Marks) (S24 - Q5a, 03 Marks) (S25 - Q5a, 03 Marks)

### Other Important Questions:

1. What is HTTP? Differentiate its persistent and non-persistent types (W25 - Q3a, 03 Marks)
2. Explain Hypertext transfer protocol (HTTP) in detail. (W23 OR Q5c, 07 Marks)
3. Explain HTTP communication with an example. (S24 OR Q5a, 03 Marks)
4. Explain functioning of HTTP with supporting diagrams. (W22 - Page 2, Q3a, 03 Marks)
5. Explain the hierarchical DNS system (W25 - Page 2, Q3c, 07 Marks)
6. Explain functionality of Domain Name System (DNS). (W22 - Page 2, Q3b, 04 Marks)
7. What is the function of Domain name services (DNS)? (W23 OR Q5a, 03 Marks)
8. Write a brief note on FTP and DHCP (W25 - Page 2, OR Q3a, 03 Marks)
9. Explain the function of following protocol in brief: ICMP, RARP, DHCP, BOOTP (W23 - Q5b, 04 Marks)
10. What is the function of following protocols? 1) ICMP 2) ARP 3) DHCP 4) BOOTP (S22 - Page 2, Q5b, 04 Marks)
11. Discuss functionality of ARP, RARP and ICMP. (W22 - Page 2, Q3c, 07 Marks)
12. Write short note on POP3 and SMTP. (S22 - Q5c, 07 Marks)
13. Write a short note on Electronic Mail. (W22 - Page 2, Q3b, 04 Marks)
14. What is Cryptography? Explain Substitution and Transposition Ciphers with examples. (W22 - Page 2, OR Q3c, 07 Marks)
15. Explain the Data Encryption Standard (DES) in details (W25 - Page 2, OR Q3c, 07 Marks)
16. What is symmetric encryption and Asymmetric encryption? (W25 - Page 2, Q3b, 04 Marks)
17. What is fire wall? Explain its working in detail. (W23 OR Q5b, 04 Marks)
18. What is Firewall? Write a note on Network Security. (W24 - Q5c, 07 Marks)
19. What is Security? Explain need for security in Internet. (W24 OR Q5a, 03 Marks)
20. Discuss various social issues related to security over Internet. (S25 OR Q5a, 03 Marks)
21. What is Network Security? Explain any one security algorithm in detail. (S25 OR Q5c, 07 Marks)

\*\*\*\*\*