Unit -1

1. What are the main differences between LAN, MAN, and WAN?

2. Describe the different network topologies and explain the advantages and disadvantages of each.

3. What is the OSI Reference Model? List and briefly explain the functions of each of its seven layers.

4. What is the TCP/IP Reference Model? How does it compare to the OSI model in terms of layers and functions?

5. Compare and contrast the OSI and TCP/IP Reference Models. What are the key similarities and differences?

6. Explain the role and functions of the Physical Layer in the OSI model.

7. What are guided media? Describe the characteristics, advantages, and disadvantages of twisted-pair cable, coaxial cable, and fiber optic cable.

8. What is unguided media? Provide examples and discuss its advantages and limitations compared to guided media.

9. How does fiber optic cable transmit data, and why is it preferred over other guided media in certain scenarios?

10. What factors influence the choice of physical media for a particular network setup?

11. write a short note on evolution of internet

12. explain line configurations and explain types of data fiow.

13. write a short note on ARPANET.

14. Discuss how internet has revolutionized many aspects of our daily lives

15. Explain twisted pair-shielded ,unshielded in detail.

2MARKS

1. What is a computer network?
2. Write any two differences between LAN and WAN.
3. Mention any two advantages of computer networks.
4. What is topology? List any two network topologies.
5. Define protocol.
6. Write any two functions of the physical layer.
7. Write any two functions of the data link layer.
8. Write any two functions of the network layer.
9. Mention any two differences between OSI and TCP/IP models.
10. What is the transport layer responsible for?
11. Name the four layers of the TCP/IP model.
12. What is guided media and unguided media? Give two examples.
13. Write two characteristics of fiber optic cable.
14. What is bandwidth?
15. What are radio waves used for in networking?
16. What is infrared transmission?
17. Which layers of the OSI model correspond to the application layer of TCP/IP?
18. What are the components of an optical fiber?
19. Define encapsulation in networking.
20. What is the main function of the application layer?

Unit -2

1. What are the key design issues of the Data Link Layer?

2. Explain the concept of framing in the Data Link Layer. Differentiate between fixed-size framing and variable-size framing.

3. What are the common flow control techniques used in the Data Link Layer?

4. Describe the types of error control mechanisms and explain the difference between error detection and error correction.

5. Explain how Cyclic Redundancy Check (CRC) works for error detection in the Data Link Layer.

6. What is the concept of Checksum? Explain the one's complement Internet checksum method.

7. What services does the Data Link Layer provide to the Network Layer?

8. Describe the Simplex protocol and the Simplex Stop-and-Wait protocol. How do they handle data transmission and errors?

9. Explain the Sliding Window Protocol and compare the One-bit, Go-Back-N, and Selective Repeat variants.

10. What is the HDLC protocol, and how does it implement data link layer functionalities? Also, briefly describe the Point-to-Point Protocol (PPP).

11. Explain in detail the different methods of framing in data link layer.
**   Fixed-size and variable-size framing.**
12. Discuss the concept of Checksum and One's Complement Internet Checksum. Explain with an example.

13. Discuss the various types of HDLC frames and explain how HDLC ensures reliable data communication.

14. Discuss the various services provided by the Data Link Layer to the Network Layer.

15. Explain the working of Sliding Window Protocols in detail.
One-bit sliding window protocol.
2MARKS

1. What is framing in Data Link Layer?
2. What are the main design issues of the Data Link Layer?
3. Differentiate between fixed-size and variable-size framing.
4. What is flow control and error control?
5. Define error detection and error correction.
6. What is CRC (Cyclic Redundancy Check)?
7. What is a Simplex protocol?
8. What is the purpose of a checksum?
9. Mention the services provided by the Data Link Layer to the Network Layer.
10. What is Media Access Control
11. What is Simplex protocol for a noisy channel?
12. Define Stop and Wait ARQ protocol.
13. What is meant by a sliding window protocol?
14. What is HDLC? List its modes of operation.
15. What is Point-to-Point Protocol (PPP)? Mention its main features.
16. What is a one-bit sliding window protocol?
17. Differentiate between Go-Back-N and Selective Repeat protocols.
18. Mention any two controlled access methods.
19. What is token passing?
20. Differentiate between noiseless and noisy channel protocols.

Unit-3

1. Explain the working of ALOHA protocol. Differentiate between Pure ALOHA and Slotted ALOHA with efficiency.

2. What is Carrier Sense Multiple Access (CSMA)? Describe its types and how they handle collisions.

3. How does CSMA with Collision Detection (CSMA/CD) work? Explain with the IEEE 802.3 Ethernet example.

   4.Discuss CSMA with Collision Avoidance (CSMA/CA). How is it used in wireless networks (e.g., Wi-Fi)?

 5.Compare and contrast Controlled Access methods: Reservation, Polling,   and Token Passing

 6. What is Channelization? Compare FDMA, TDMA, and CDMA with diagrams and use cases.

 7. What are the key design issues in the network layer? Briefly explain each.

  8. Explain Store-and-Forward Packet Switching. How does it differ from circuit switching?

   9. Describe the services provided by the Network Layer to the Transport Layer.

   10 Differentiate between Connection-Oriented and Connectionless services. Compare Datagram and Virtual Circuit networks.

11. Compare Virtual Circuit Networks and Datagram Networks.

12. Discuss the advantages and disadvantages of packet switching.

13. Compare Random Access and Controlled Access methods.

14. Explain CSMA/CD and CSMA/CA with diagrams.

15. Explain how the Network Layer provides reliable delivery to the Transport Layer.

16.Toxonomy of Multiple access protocol

2MARKS

1. What is Controlled Access? Give any two examples.

2. Define ALOHA protocol.

3. What is CSMA/CD and CSMA/CA?

4. What is Random Access in MAC?

5. What is Carrier Sense Multiple Access (CSM

6. What is collision detection?

7. Define reservation in controlled access.

8. What is the role of the primary and secondary station in polling?

9. Define token passing.

10. What is channelization?

11. What are the main design issues of the Network Layer?

12. Define packet switching.

13. What are the advantages of datagram networks?

14. Write any two functions of the Network Layer in connectionless service

15. What is the difference between logical and physical addressing?

16. What are the three phases of virtual circuit service?

17. Write one real-time application of TDMA.

18. What is the difference between logical and physical addressing?

19. What is the purpose of Random Access Protocols?

20. Define polling in MAC.

21. Explain vulnerable time

Unit 4

1. Explain the Optimality Principle in Routing. How is it used to determine the shortest path?

2.Compare and contrast Shortest Path Routing and Distance Vector Routing algorithms

3, What is Hierarchical Routing? Explain its need and working with an example.

4. **Explain the General Principles of Congestion Control in Networks.**

5.Discuss Congestion Prevention Policies in detail.

 6.Describe the Leaky Bucket and Token Bucket Algorithms. Compare them.

7. **How do different networks differ, and how can they be connected? Explain with tunneling and gateway concepts.**

8, **What is Fragmentation in networking? Differentiate between Transparent and Non-transparent Fragmentation.**

9. **Explain IPv4 protocol. Describe IPv4 header format in detail.**

   Explain **Classful Addressing** with examples of each class.

10. **Compare IPv4 and IPv6 in terms of address format, header structure, and features.**

11. **Explain Congestion Control Principles and Prevention Policies.**

12. **Explain Classful Addressing with examples of each class.**

13. **Explain Fragmentation and Reassembly in IP.**

14. **Explain shortest path routing (Dijkstra's algorithm).**

15. **Explain Congestion and its Effects in a Network.**

16. **Describe the Leaky Bucket Algorithm. Working principle and example**.

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2MARKS

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1. Define routing.
2. What is the optimality principle?

3. What is a shortest path routing algorithm?
4. What is a distance vector routing algorithm?
5. What is hierarchical routing?
6. Define congestion and its causes.
7. What is congestion control?
8. List the general principles of congestion control.
9. What is the difference between congestion control and flow control?
10. Define the leaky bucket algorithm.
11. Define the token bucket algorithm.
12. What is the purpose of traffic shaping?
13. How do networks differ?
14. What is tunnelling?
15. What is internetwork routing?
16. Define fragmentation.
17. What is the need for fragmentation?
18. What is IPv4?
19. Draw and label the IPv4 header format.
20. What is an IP address?
21. What are the five classes in classful addressing?

Unit 5

1. What are the services provided by the Transport Layer? How is it different from the Network Layer?

2. What is a Port Number? Why is it important in transport layer protocols?

3. Explain the User Datagram Protocol (UDP). What are its features, structure, and applications?

4. Describe the Transmission Control Protocol (TCP). What services does it provide?

5. Explain the TCP Segment Format and the Three-Way Handshake used in TCP connection establishment.

6. What is Flow Control in TCP? Explain the concept of sliding window protocol.
7. How is Error Control achieved in TCP? What mechanisms are used?

8. Explain Congestion Control in TCP. Describe Slow Start, Congestion Avoidance, and Fast Recovery.

9.Explain the architecture of Electronic Mail (Email). How does Web-based Email differ from traditional Email?

10. What is HTTP? Explain how it works in the client-server model.

11.What is the Domain Name System (DNS)? How does it resolve domain names into IP addresses? *(Bonus Question)*

12.What is TELNET? Differentiate between local and remote logging.
(Alternative if needed)

13. Explain Web-based E-mail and E-mail Security features.

14. Explain TELNET protocol and local vs remote login.

15. Explain DNS architecture, message format, and resolution process.

2MARKS

1.Define port number.
2. Define User Datagram Protocol (UDP).
3. Define Transmission Control Protocol (TCP).
4. What is the World Wide Web (WWW)?
5. Define HTTP.
6. Mention the two versions of HTTP.
7.What is a web client and a web server?
8. What are the components of a URL?
9. What is Electronic Mail (E-mail)?
10 What are the functions of E-mail protocols?
11.What is SMTP?
12.What is POP3?
13.What is IMAP?
14. What is web-based mail?
15What is e-mail security?
16.What is TELNET used for?
17.What is the difference between local and remote login?
18.What is DNS?
19 Define domain name and domain namespace.

20 What is the purpose of DNS?
21 What is a resolver?