

UNIT I

1. Explain basic communication system with block diagram.
2. Discuss parallel transmission and serial transmission.
3. List and explain the function of each layer of ISO's OSI model with neat diagram.
4. Explain the process of Amplitude Shift Keying with the data '10110'.
5. Differentiate between asynchronous transmission and synchronous transmission.
6. Show Unipolar NRZ and Polar RZ encoding pattern for bit stream '10110100101'
7. State and explain various types of networks. What are the different ways to access the Internet?
8. What is Internet standard? Explain the maturity levels of RFC.
9. Protocol layering can be found in many aspects of our lives such as air travelling. Imagine you make a round-trip to spend some time on vacation at a resort. You need to go through some processes at your city airport before flying. You also need to go through some processes when you arrive at the resort airport. Show the protocol layering for the round trip using some layers such as baggage checking/claiming, boarding/un boarding, takeoff/landing.
10. Discuss the different quality of service characteristics for overall network performance.
11. What are the different modes in which the transmission of binary data can be accomplished? Explain each mode.
12. Draw the constellation diagram for the following cases. Find the peak amplitude value for each case and define the type of modulation (ASK, FSK, PSK, or QAM). The numbers in parentheses define the values of I and Q respectively.
 - I. Two points at (2, 0) and (3, 0)
 - II. Two points at (3, 0) and (-3, 0)
 - III. Four points at (2, 2), (-2, 2), (-2, -2), and (2, -2)
 - IV. Two points at (0, 2) and (0, -2)
13. Discuss the advantages and disadvantages of different network topologies.
14. What is Shannon Capacity of noise channel?
The signal-to-noise ratio is given as 36db and the channel bandwidth is 2MHz. Calculate theoretical channel capacity?
15. What are the different types of transmission impairments?
16. Distinguish between data rate and signal rate.
A signal is carrying data in which one data element is encoded as one signal element ($r=1$). If the bit rate is 100Kbps, What is the average value of the baud rate if c is between 0 and 1.
17. Define Constellation diagram. Explain its role in analog transmission.
18. Define Data communication and its various components.
19. Define Modulation. Write a short note on Amplitude Modulation.
20. Explain the following terms in relation with data communication:
 - a) Half duplex system
 - b) Full duplex system

UNIT II

1. Draw and explain Model of Spread Spectrum in digital communication system.
2. What are the problems in connecting multiple devices? How switching techniques overcome these problems?
3. What are different duties assigned to data link layer of ISO's OSI model? Explain in brief.
4. Explain basic ARQ system with its type.
5. Generate the CRC code for message '1001101010'. Give generator polynomial. $g(X)=X^4 + X^2 + 1$
6. Compare twisted pair, co-axial and fiber optic cable
7. List the different error correcting codes. Explain any two in detail with examples.
8. What are the functions of data link layer? What is the relationship between packets and frames? Explain the different methods of framing.
9. We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 2 bits from each digital source, but one extra bit is added to each frame for synchronization. Answer the following questions:
 - a) What is the size of an output frame in bits?
 - b) What is the output frame rate?
 - c) What is the duration of an output frame?
 - d) What is the output data rate?
 - e) What is the efficiency of the system (ratio of useful bits to the total bits)?
10. What are the different types of transmission media? Explain each type.
11. What is virtual circuit network? What are its characteristics?
12. Explain the three phases of communication in a circuit switched network.
13. Differentiate between FDM and TDM.
14. Write a short note on Spread Spectrum Modulation (SSM) techniques along with its application.
15. Discuss the major classification of transmission media.
16. What is Packet Switching? Explain its method of implementation.
17. Explain the following terms:
18. Define Error under scope of networking and explain its types.
19. Describe the goals of Multiplexing. Which are the 3 multiplexing techniques.
20. Define FHSS. Explain how it achieves bandwidth sharing.
21. Explain the advantages and disadvantages of optical fibers.
22. Explain two technologies of Circuit Switching.
23. List and explain the services provided by data link layer.
24. How does a single-bit-error differ from a burst error?

UNIT III

1. Write a short note on Framing and explain any 2 framing methods with example.
2. Explain concept of sliding window with movement of both sender and receiver window.
3. Draw and explain flow of ALOHA protocol and compare Pure ALOHA with Slotted ALOHA.
4. Explain the architecture of Bluetooth with all its layer.
5. Write a short note on
 - a. GPS
 - b. Geostationary Satellite.
6. What is HDLC? What are the different types of frames in HDLC? Explain the different fields in HDLC frames.
7. Explain the transition phases of point-to-point protocol.
8. Discuss the addressing mechanisms of IEEE 802.11 project.
9. Explain the spanning tree algorithm.
10. What is Virtual LAN? How are stations grouped into different VLANs? Explain.
11. Compare and Contrast flow control and error control
12. Explain the working of stop-and-wait protocol.
13. Discuss the concept of pure ALOHA
14. Write a note on TDMA.
15. Discuss any five characteristics of Standard Ethernet.
16. Write short note on routers
17. Explain ALOHA system with its two versions.
18. Discuss GOBACK N ARO protocol in detail.
19. Differentiate between satellite communication and optical communication.
20. Explain the following connecting devices in networking:
 - a) Bridge
 - b) Gateway
21. Explain CSMA with collision detection.

UNIT IV

1. What do you mean by forwarding? Explain Next hop method and Route method of forwarding.
2. Differentiate between Adaptive routing algorithm and Non-adaptive routing algorithm.
3. Draw structure of IPv4 header and explain various fields.
4. What are drawbacks of IP and how ICMP overcome it? Explain.
5. Write a short note on OSPF and write features of OSPF.
6. What are advantages of Fragmentation? Explain two strategies of fragmentation.
7. Explain the two ways of forwarding of IP packets.
8. What is dynamic host configuration protocol? Explain the DHCP message format.
9.
 - i. Assume the shortest path in a graph from node A to node H is $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow F \rightarrow G \rightarrow H$. Also assume that the shortest path from node H to node N is $H \rightarrow G \rightarrow F \rightarrow E \rightarrow D \rightarrow C \rightarrow B \rightarrow A \rightarrow N$. What is the shortest path from node A to node N?
 - ii. Explain why a router using link-state routing needs to receive the whole LSDB before creating and using its forwarding table. In other words, why can't the router create its forwarding table with a partially received LSDB?
 - iii. Is the path-vector routing algorithm closer to the distance-vector routing algorithm or to the link-state routing algorithm? Explain.
10. What is routing information protocol? Explain the RIP algorithm.
11. Draw and explain the IPv6 header format.
12. What are the different transition strategies from IPv4 to IPv6? Explain.
13. Explain the terms:
 - a) Connection Oriented Network Services.
 - b) Connectionless Network Services.
14. Write a short note on Static Algorithm and Explain any two
15. List and explain services provided by network layer.
16. Write a short note on NAT.
17. How to overcome instability in Distance Vector Routing Protocol.
18. Discuss different timers in RIP.
19. Differentiate between IPV4 and IPV6.
20. For a given Class 'C' network 195.188.65.0 design equal subnets in such a way that each subnet has at least 60 nodes.
21. A class 'B' network on the internet has a subnet mask of 255.255.240.0 What is the maximum no of hosts per sub network.

UNIT V

1. Explain functions given to transport layer of ISO's OSI.
2. Explain following concepts with the context of TCP
 - a. Stream delivery
 - b. Sending and Receiving buffers.
3. Write a short note on UDP.
4. How DNS is beneficial for user? Explain.
5. What were the problems with message sending? And how MIME resolve them?
6. Explain the following:
 - (a) WWW
 - (b) FTP
7. With the help of a diagram, explain the Go-Back-N protocol.
8. Explain the persistent and non-persistent connection
9. Explain the architecture of electronic mail.
10. What is DNS? How is name-address resolution done?
11. What is secure shell? Explain the components of secure shell.
12. In a network with fixed value for $m > 1$, we can either use the Go-Back-N or the Selective-Repeat protocol. Describe the advantage and the disadvantage of using each. What other network criteria should be considered to select either of these protocols?
13. Differentiate between TCP and UDP
14. Write short note on the following:
 - a) Telnet
 - b) FTP
15. Explain Addressing Issues of transport protocol
16. Write a short note on TCP
17. Briefly explain different types of timers in TCP
18. Explain the Architecture of WWW.
19. Explain the process of transferring a mail
20. Discuss the three-way handshaking in TCP for connection establishment.
21. Explain the concept CSMA/CA.
22. Explain Simple Mail Transfer Protocol.