**Unit-3**

1. Explain the difference between FDMA, TDMA, and CDMA in terms of channel allocation and usage.

* 1. If an FDMA system divides a 10 MHz bandwidth into 50 channels, each with a guard band of 5 kHz, calculate the effective bandwidth available per channel.
  2. In TDMA, if each user is allocated a time slot of 1 ms in a 10 ms frame, determine the maximum number of users that can share the channel.

1. Describe the different types of Ethernet standards, including Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet. How do they differ in terms of speed, cabling, and maximum distance?
2. Draw and label the structure of an Ethernet frame. Explain the purpose of each field, particularly the preamble, source and destination addresses, and FCS (Frame Check Sequence). How does the FCS help ensure data integrity?
3. Discuss network layer services and explain packet switching in detail.
4. Describe the types of Ethernet and their characteristics. How does Ethernet support network communication?

**Unit-4**

1. Explain IPv4 addressing, including the roles of DHCP and NAT in IP allocation.
2. A company has been assigned the IP address range 192.168.1.0/24. They need to create four subnets with equal sizes.
   1. Calculate the subnet mask and the number of usable hosts per subnet.
   2. List the first and last IP addresses in each subnet.
3. Describe how DHCP works in assigning IP addresses to devices on a network. Explain the process of lease renewal and its significance in managing network resources.
4. Given an IP address of 132.10.15.23, determine:
   1. Its class
   2. The network and host portions
   3. The default subnet mask for this class
5. A company has been allocated a CIDR block of 192.168.10.0/26.
   1. Calculate the subnet mask in dotted decimal notation.
   2. Determine the number of available subnets and hosts per subnet.
   3. List the range of IP addresses for the first two subnets.
6. Explain the concept of classful addressing in IPv4. Describe the characteristics and default subnet masks of Class A, Class B, and Class C addresses.
7. Compare and contrast classful and classless addressing. Discuss how routing is impacted by each method, especially in terms of routing table size and flexibility.

**Unit-5**

1. Explain the difference between connection-oriented and connectionless services at the transport layer. Provide real-world examples to illustrate these services.
2. In a TCP connection, the receiver has a window size of 5000 bytes, and the sender’s last acknowledgment number was 2000. The sender wants to send 3000 bytes of data.
   1. Will the sender be allowed to send the entire 3000 bytes?
   2. Calculate the new acknowledgment number if the data is successfully received.
3. Illustrate the TCP three-way handshake process and discuss its importance in connection establishment.
4. A TCP connection has an initial congestion window size of 1 MSS (Maximum Segment Size). After each successful acknowledgment, the congestion window increases by 1 MSS (Slow Start Phase).
   1. Calculate the congestion window size after 5 acknowledgments.
   2. Explain what happens to the congestion window size if a packet loss occurs at this stage.
5. In a Go-Back-N ARQ system, the sender is allowed to send frames 0 through 7, with a window size of 4.
   1. If frames 0, 1, 2, and 3 are sent, but frame 2 is lost, explain how the sender and receiver handle this situation.
6. Compare UDP and TCP segment formats. Highlight the fields unique to each protocol and explain their significance.
7. Compare HTTP and DNS in terms of functionality and application in networks. Provide scenarios where each protocol is essential for user experience on the internet.