## 1. Explain the addressing modes in TCP/IP model. (CO1)

In the TCP/IP model, addressing modes are essential for identifying devices and processes in a network. The major addressing modes include:  
- \*\*Physical Addressing (MAC Address):\*\* Operates at the Data Link Layer, identifies devices within a local network.  
- \*\*Logical Addressing (IP Address):\*\* Operates at the Network Layer, uniquely identifies a device across interconnected networks.  
- \*\*Port Addressing:\*\* Operates at the Transport Layer, identifies specific processes or applications running on a host.  
- \*\*Domain Names (DNS):\*\* Provides a human-readable representation mapped to IP addresses.

## 2. Elaborate on different guided transmission media. (CO1)

Guided transmission media are physical pathways that transmit signals from sender to receiver. They include:  
- \*\*Twisted Pair Cable:\*\* Two insulated copper wires twisted together, used in telephony and LANs. Types: Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP).  
- \*\*Coaxial Cable:\*\* Consists of a central conductor, insulating layer, metallic shield, and outer cover. It supports higher bandwidth and is resistant to interference.  
- \*\*Optical Fiber:\*\* Uses light to transmit data. It provides very high bandwidth, long-distance communication, and immunity to electromagnetic interference.

## 3. Explain how Go-Back-N ARQ and Selective Repeat ARQ work. (CO2)

- \*\*Go-Back-N ARQ:\*\*  
 The sender can send multiple frames (up to a window size) without waiting for an acknowledgment. If an error is detected in a frame, that frame and all subsequent frames are retransmitted.  
- \*\*Selective Repeat ARQ:\*\*  
 The sender can also send multiple frames, but only the erroneous or lost frames are retransmitted, not the entire sequence. This improves efficiency compared to Go-Back-N.

## 4. Explain with suitable diagrams the functioning of CSMA/CA and CSMA/CD procedures. (CO2)

- \*\*CSMA/CD (Carrier Sense Multiple Access with Collision Detection):\*\*  
 Used in wired Ethernet. A device checks the medium before sending data. If a collision occurs, it stops, sends a jam signal, waits for a random backoff time, and retransmits.  
  
- \*\*CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance):\*\*  
 Used in wireless networks. Since collision detection is difficult, devices attempt to avoid collisions using methods such as inter-frame spacing, acknowledgment frames, and RTS/CTS (Request to Send / Clear to Send) handshakes.  
  
(Note: Diagrams should be drawn in exam or presentation to illustrate the sequence of events clearly.)