Q) Difference between OSI and TCP/IP model.

- **Layers:**
- OSI Model: 7 layers (Physical, Data Link, Network, Transport, Session, Presentation, Application)
- TCP/IP Model: 5 layers (Physical, Data Link, Network, Transport, Application)
- **Purpose:**
- OSI Model: Describes how different networking protocols interact
- TCP/IP Model: A practical framework used for designing and implementing networks
- **Development:**
- OSI Model: Developed by ISO (International Organization for Standardization)
- TCP/IP Model: Developed by ARPANET (Advanced Research Projects Agency Network)
- **Protocol Focus:**
- OSI Model: More theoretical, focusing on the functionality of each layer
- TCP/IP Model: More practical, focused on real-world protocols (like TCP and IP) **Layer Functions:**
- OSI Model: Each layer has a specific function and interacts with layers directly above and below it

- TCP/IP Model: Some layers combine functions from OSI model layers (e.g., TCP/IP Application layer combines OSI's Application, Presentation, and Session layers)

- **Flexibility:**

- OSI Model: More rigid and detailed, often used as a reference model
- TCP/IP Model: More flexible and widely used in practical applications

Q) Difference between Peer-to-Peer (P2P) and Client/Server Network.

- **Peer-to-Peer (P2P) Network:**
  - **Structure:** All computers (peers) are equal and can act as both clients and servers.
  - **Resource Sharing:** Each peer can share resources like files and printers directly with other peers.
  - **Control:** There is no central control; all peers have equal authority.
  - **Examples:** File-sharing applications, small office networks.
- **Client-Server Network:**
  - **Structure:** There are dedicated servers that provide resources or services, and clients that request and use these resources.

- **Resource Sharing:** Servers store and manage resources (like files or applications), and clients access these resources from the servers.
- **Control:** Centralized control through servers that manage access and security.
  Examples: Corporate networks, web servers, email servers.

Q) What are 7 layers of OSI model and write each of their functionalities?

- **Physical Layer:**
- **Role:** Deals with the physical connection between devices.
- **Example:** Cables, switches, and network cards. It defines how bits are transmitted over a physical medium.

- **Data Link Layer:**
- **Role:** Ensures reliable communication between directly connected devices and handles errors from the Physical Layer.
- **Example:** Ethernet frames and MAC addresses. It packages bits into frames and manages error detection.

- **Network Layer:**
- **Role:** Routes data from the source to the destination across multiple networks.
- **Example:** IP addresses and routers. It determines the best path for data to travel.

- **Transport Layer:**

- **Role:** Ensures complete and accurate data transfer between systems.
- **Example:** TCP and UDP. It manages data flow control, error recovery, and retransmission of lost data.
- **Session Layer:**
- **Role:** Manages sessions or connections between applications.
- **Example:** Controls dialogue and synchronization between applications. It sets up, manages, and terminates sessions.
- **Presentation Layer:**
- **Role:** Translates data between the network format and the application format.
- **Example:** Data encryption, compression, and translation. It ensures that data is presented in a readable format for the application layer.
- **Application Layer:**
- **Role:** Provides network services directly to end-user applications.
- **Example:** HTTP, FTP, and email protocols. It interacts with software applications to provide network services.

Q) What are the principles behind the OSI model ?

-> The OSI (Open Systems Interconnection) model is a conceptual framework that standardizes the functions of a communication system into seven distinct layers. The principles behind the OSI model guide its design and implementation. These principles include:

1. **Layering:** The fundamental principle is dividing the communication system into layers, each with a well-defined function. This modular approach simplifies design, implementation, and troubleshooting. Each layer provides services to the layer above it and uses the services of the layer below it.

2. **Abstraction:** Each layer focuses on its specific function, abstracting the details of the lower layers. This allows changes in one layer without affecting other layers, promoting flexibility and adaptability.

3. **Well-defined interfaces:** The interactions between layers are clearly defined through standardized interfaces. This ensures interoperability between different implementations and facilitates the development of compatible network components.

4. **Standardization:** The OSI model promotes the use of internationally standardized protocols within each layer. This ensures that devices from different vendors can communicate seamlessly across networks.

5. **Flexibility:** The model allows for the addition or modification of layers as technology evolves, maintaining its relevance in a dynamic networking landscape.

6. **Scalability:** The layered architecture allows for easy expansion and adaptation to accommodate larger or more complex networks without a complete redesign.

7. **Transparency:** The model promotes transparency by hiding the implementation details of lower layers from higher layers. This

enables the higher layers to focus on their specific tasks without needing to understand the inner workings of the lower layers.