1)The OSI (Open Systems Interconnection) model is a conceptual framework used to understand and implement network communications by dividing the process into seven distinct layers. Each layer performs a specific function and communicates with the layers directly above and below it. Here are the details of each layer:

1. Physical Layer

Function: Transmits raw bit stream over the physical medium.

Hardware: Cables, switches, hubs, network adapters.

Protocols and Standards: Ethernet (IEEE 802.3), USB, Bluetooth, RS-232.

2. Data Link Layer

Function: Provides node-to-node data transfer—a link between two directly connected nodes. It handles error detection and correction from the physical layer.

Sub-layers:

Logical Link Control (LLC):Manages frame synchronization, flow control, and error checking.

Media Access Control (MAC):Controls how devices on the network gain access to the data and permission to transmit it.

Protocols and Standards:Ethernet (IEEE 802.3), PPP, Frame Relay, MAC addresses.

3. Network Layer

Function: Determines the best path to move data from source to destination across multiple networks. It handles packet forwarding, including routing through different routers.

Protocols and Standards:IP (Internet Protocol), ICMP, ARP, RIP, OSPF, BGP.

4. Transport Layer

Function: Ensures complete data transfer. It provides end-to-end communication services for applications and can include error recovery, flow control, and retransmission.

Protocols and Standards:TCP (Transmission Control Protocol), UDP (User Datagram Protocol), SCTP.

5. Session Layer

Function: Manages sessions between applications. It establishes, manages, and terminates connections between local and remote applications.

Protocols and Standards: NetBIOS, RPC, PPTP, SAP.

for the application layer.

Protocols and Standards:JPEG, MPEG, GIF, SSL/TLS, ASCII, EBCDIC

7. Application Layer

Function: Provides network services directly to applications. It is the layer closest to the end user and facilitates network services such as file transfers, email, and network software services.

Protocols and Standards:HTTP, FTP, SMTP, DNS, Telnet, SNMP.