What is open system interconnections (OSI) and describe its layers?

Ans:- OSI Stands for open system Interconnection is a reference model that describes how information from a software application in one computer moves through a physical medium to the software application in another computer.

* History:-

OSI model was developed by the International organization for Standardization (ISO) in 1984 and it is now considered as an architectural model for the inter-computer communications.

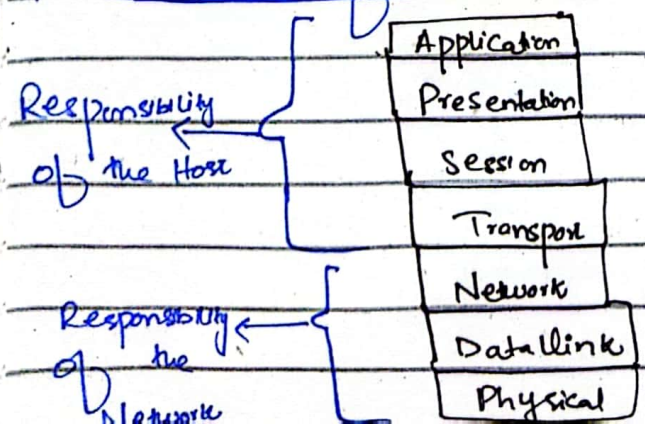
* Layers of OSI Model:-

OSI model divides the whole task into seven smaller and manangeable tasks. Each layer is self-contained, so that task assigned to each layer can be performed independently. The OSI model is divided into two layers, upper layers and lower layers.

* upper layer:- mainly deals with the application related issues. The upper layers focus on user applications and how files are represented on computers before transfer.

* lower layer:- deals with data transport issues. The lower layers are concerned with how the communication occross a network actually occurs.

* Characteristics of OSI Model:-



* 7 layers of OSI model:-

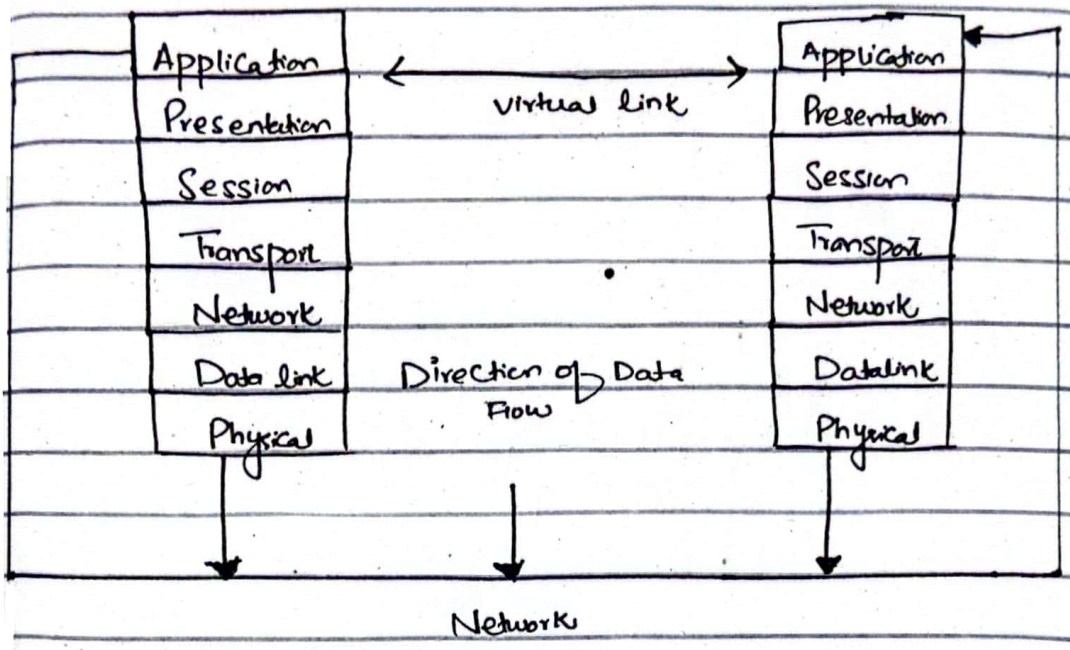
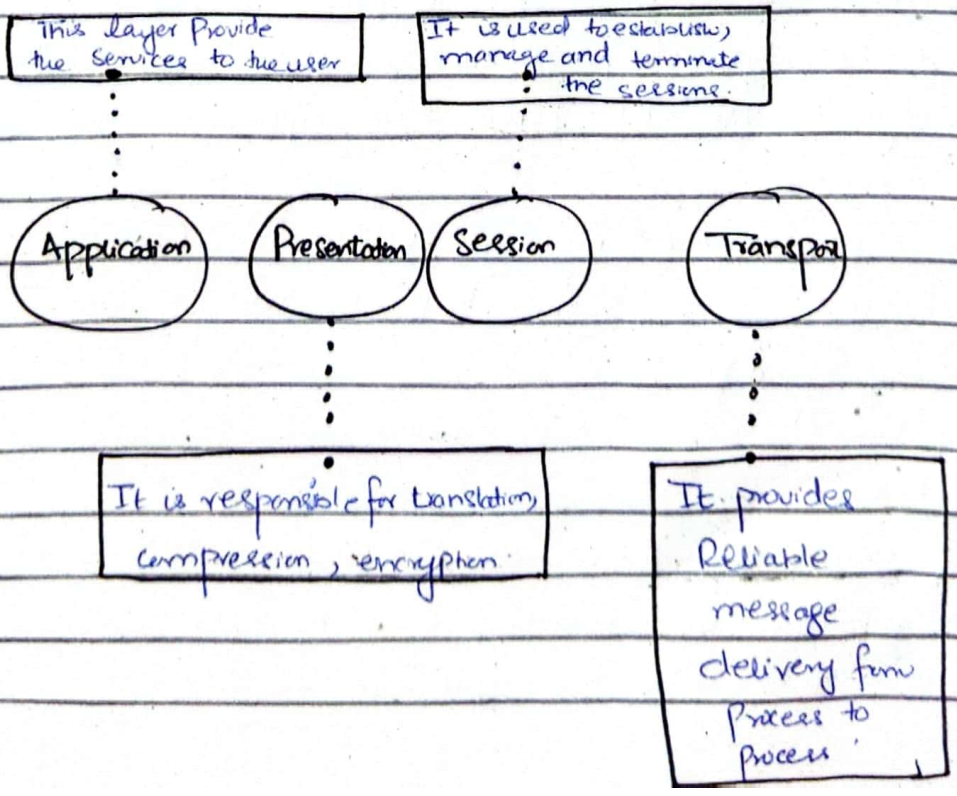
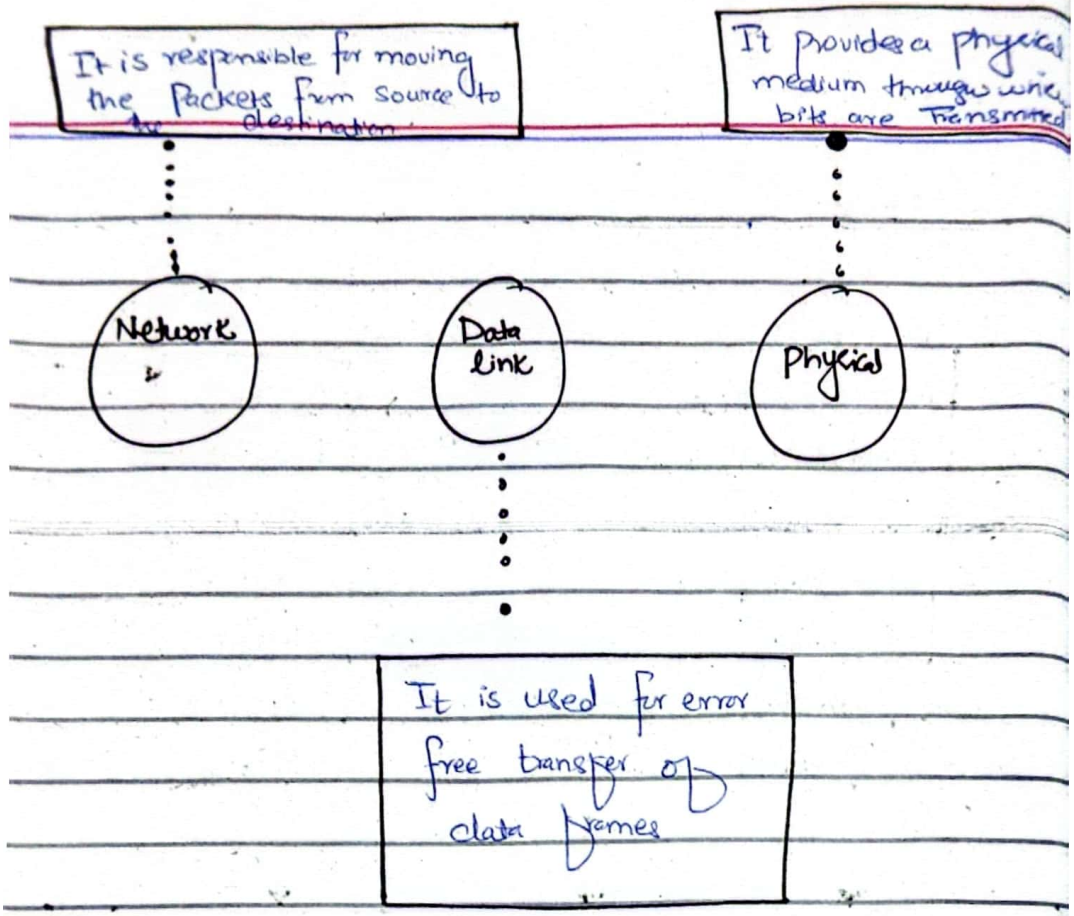


Figure: OSI Model

* Functions of 7 layers:-





★ Practical Application of OSI Model:-

1- **Application layer:-** You compose an email using an email client like outlook or Gmail. This layer provides the interface for email applications to interact with the network using SMTP Protocol.

2- **Presentation layer:-** The email client encodes your email into a standardized format such as ASCII or UTF-8. This layer translates data between the application layer and the network.

3- **Session layer:-** A session is established between your email client and a email server to send the email. This layer manages and controls the connections between computers. It ensures that sessions are maintained and synchronized.

4- **Transport layer:-** The email client breaks the email into segments and ensures each segment reaches the destination using TCP. This layer ensures data integrity, data flow, error checking and retransmission.

5- **Network layer:-** The email client attaches the IP addresses of the recipient's email server to each segment. This layer handles the routing and forwarding of data packets across the network.

6- **Data link layer:-** Each segment is encapsulated into frames with MAC addresses of the source and destination devices by the Network Interface Card. It ensures error-free transmission between adjacent network nodes by using MAC addresses.

7- **Physical layer:-** The frames are converted into electrical signals and transmitted over the physical medium.

* **Flow of Data:-** The email travels down the layers from your computer (Application to physical), across the network and then up the layers on the recipient's email server (physical to Application) ensuring the email is delivered and properly formatted for reading.