



# Computer Networks KCS-603

## ASSIGNMENT-1

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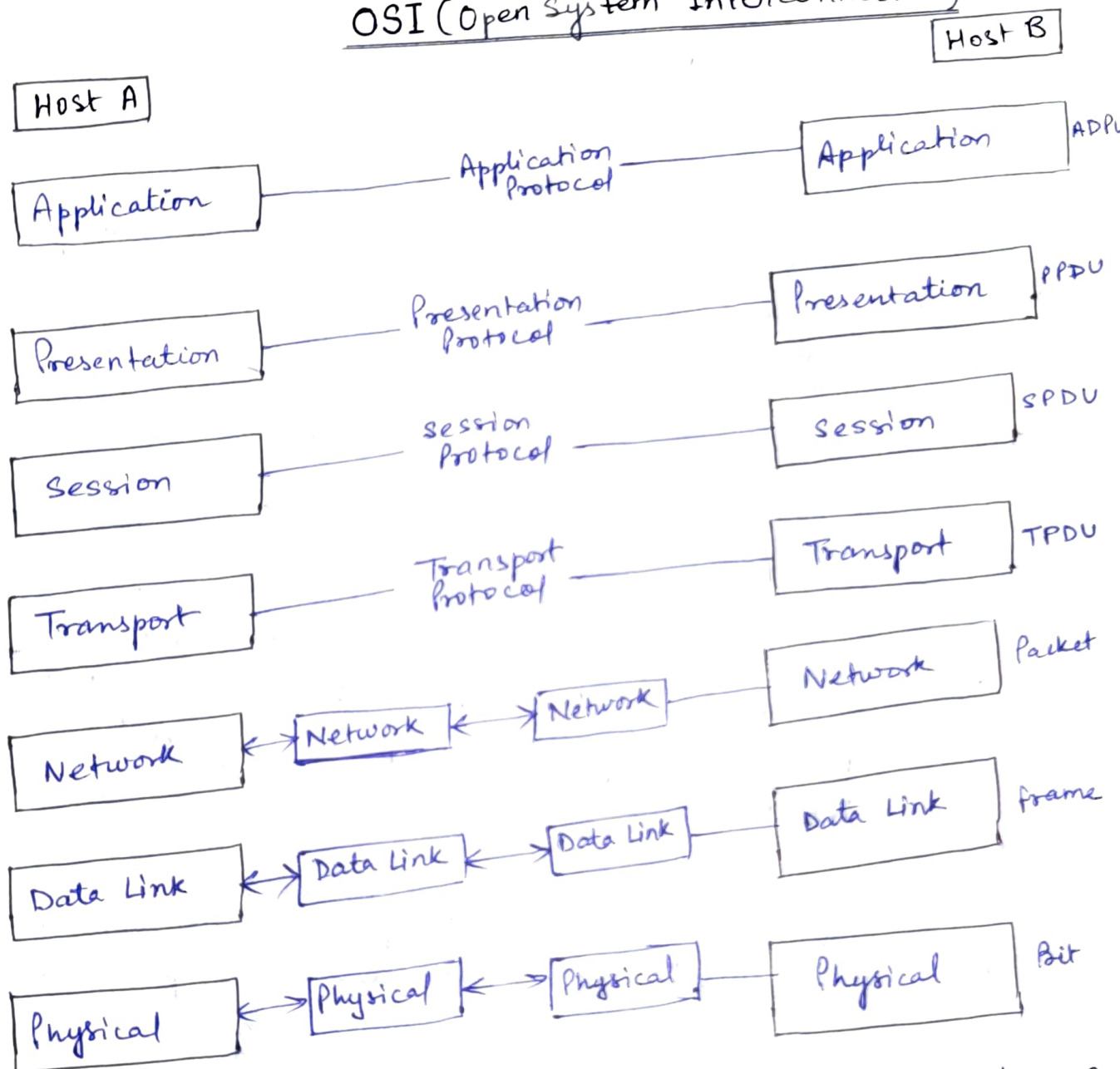
# Computer Networks(KCS-603)

## Assignment -01

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Ques-1 What are the different layers of OSI Model? Explain in detail with a suitable diagram.

### OSI (Open System Interconnection)



Ques-2 Explain Network structure and its architecture? Describe its protocols, Layering principles and Services.

A computer network's structure involves interconnected nodes that communicate and share resources. The

architecture is typically defined by its design & organisation.

Protocols: Networks rely on protocols for communication. Common ones include TCP/IP governing internet communication & HTTP for web browsing.

Layering Principles: The OSI model divides network functionality into seven layers, ensuring modular design. Examples include the physical layer (hardware) and application layer (user interfaces).

Services: Networks provide various services like file sharing, email, and web browsing. These services rely on specific protocols and layers for efficient operation.

Ques-3 Write short note on

(i) TCP/IP Protocol Suite

TCP/IP stands for Transmission Control Protocol and is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP is also used as a communications protocol in a private computer network (an intranet or extranet).

(ii) Network devices and components

Network devices and components are essential elements in the architecture of computer networks. These include routers, switches, hubs, modems, network interface card (NICs), and cables.

- Routers: Responsible for directing traffic between different networks.

- Switches: Used to connect devices within a Local Area Network (LAN) and manage data traffic.



- Hubs : Basic devices that connect multiple Ethernet devices in a network.
- Modems : Convert digital data from a computer into analog signals for transmission over telephone lines (for DSL) or cable lines (for cable internet).
- NICs : Hardware that enables devices to connect to a network by providing a physical connection to the network medium.
- Cables : Physical medium used to connect network devices, such as Ethernet cables (for wired connections) or fiber optic cables (for high-speed data transmission).

These components work together to facilitate communication and data exchange within a network, enabling devices to connect & share resources efficiently.

### (iii) Switching Techniques and multiplexing.

#### Switching Techniques:

- Circuit Switching : Dedicated path established before data transfer.
- Packet Switching : Data divided into packets, routed independently.
- Message Switching : Entire message sent as a single unit, stored & forwarded.

#### Multiplexing

- Time Division Multiplexing (TDM) : Bandwidth divided into time slots
- Frequency Division Multiplexing (FDM) : Bandwidth Divided into frequency bands

→ Wavelength division Multiplexing (WDM):  
Optical spectrum divided into wavelengths.

#### (iv) Transmission Impairment & its Types.

Transmission impairment refers to any degradation or distortion of a signal as it travels through a network medium. There are several types of transmission impairments.

- ① Attenuation: Reduction in signal strength as it travels through a medium, typically due to distance or optical obstacles. Attenuation can result in weaker signals & slower transmission speeds.
- ② Noise: Unwanted interference that disrupts the signal, often caused by external factors such as electromagnetic interference (EMI) or radio frequency interference (RFI). Noise can lead to error in data transmission and decreased network performance.
- ③ Distortion: Alteration of the signal's waveform, usually caused by factors like multipath propagation or signal reflections. Distortion can result in signal loss or corruption, affecting the accuracy of transmitted data.
- ④ Delay: Time taken for a signal to travel from the source to the destination, influenced by factors such as propagation delay, transmission delay, queuing delay. Excessive delay can lead to latency issues & decreased network responsiveness.
- ⑤ Jitter: Variability in the arrival times of data packets, often caused by network congestion or varying transmission paths. Jitter can result in packet loss, out-of-order delivery & degraded voice or video quality in real-time applications.