

Q1 Define Networking?

A: Networking refers to the linking of computers and communication devices which interconnect through a network & are separated by unique device identifiers.

Q2 What are the various parameters according to which computer networks are classified?

A: Computer networks are classified according to various parameters \Rightarrow

- ① Types of Connection
- ② Physical Topology
- ③ Reach of the network

Q3 List the layers present in Internet protocol suite?

A: The 4 layers of Internet protocol suite are:

- ① Link Layer
- ② Internet Layer
- ③ Transport Layer
- ④ Application Layer

Q4 What are the most commonly used traditional layered network models?

A: The most commonly used traditional layered are:

- ① Open Systems Interconnection (ISO-OSI).
- ② Internet protocol suite.

Q5) Define IoT

Ans: IoT (Internet of Things) refers to network of physical objects i.e., things that are embedded with sensors, software & other technologies for the purpose of connecting & exchanging data with other devices or systems over the internet.

Q6) What are the different types of physical topologies?

Ans: The different types of Physical topologies are:

- ① Star
- ② Mesh
- ③ Bus
- ④ Ring

Q7) List two disadvantages of Wide area Network?

Ans: ① Due to Long transmission range WANs tends to have more errors & noise during transmission.

② Very costly to maintain.

Q8) What are the advantages of Mesh Topology?

Ans: ① No traffic jams.
② Robustness & resilience.
③ Privacy & security.

Q9) What are the responsibilities of Session Layer?

Ans: The responsibilities of Session Layer are establishing, controlling & terminating communication between the network devices.

Q10) What are applications of Network Layer?

- AQ: ① Logical addressing.
② Routing & Path determination.
③ Fragmentation & reassembly.

Q11) What is M2M?

A. M2M (Machine to Machine) is a system of connected Machines & devices which can talk amongst themselves without any human intervention.

Q12) Define Cyber Physical system?

A. Cyber physical system is a closed control loop system for sensing, processing & actuation using a feedback mechanism.

Q13) Explain the following Layers of OSI model?

A. a) Network Layer

- This network is a media layer & layer 3 of the OSI model.
- It provides a means of routing data to the various hosts connected to different networks through logical paths called virtual circuits.
- These logical paths may pass through other intermediate hosts (nodes) before reaching the actual destination hosts.

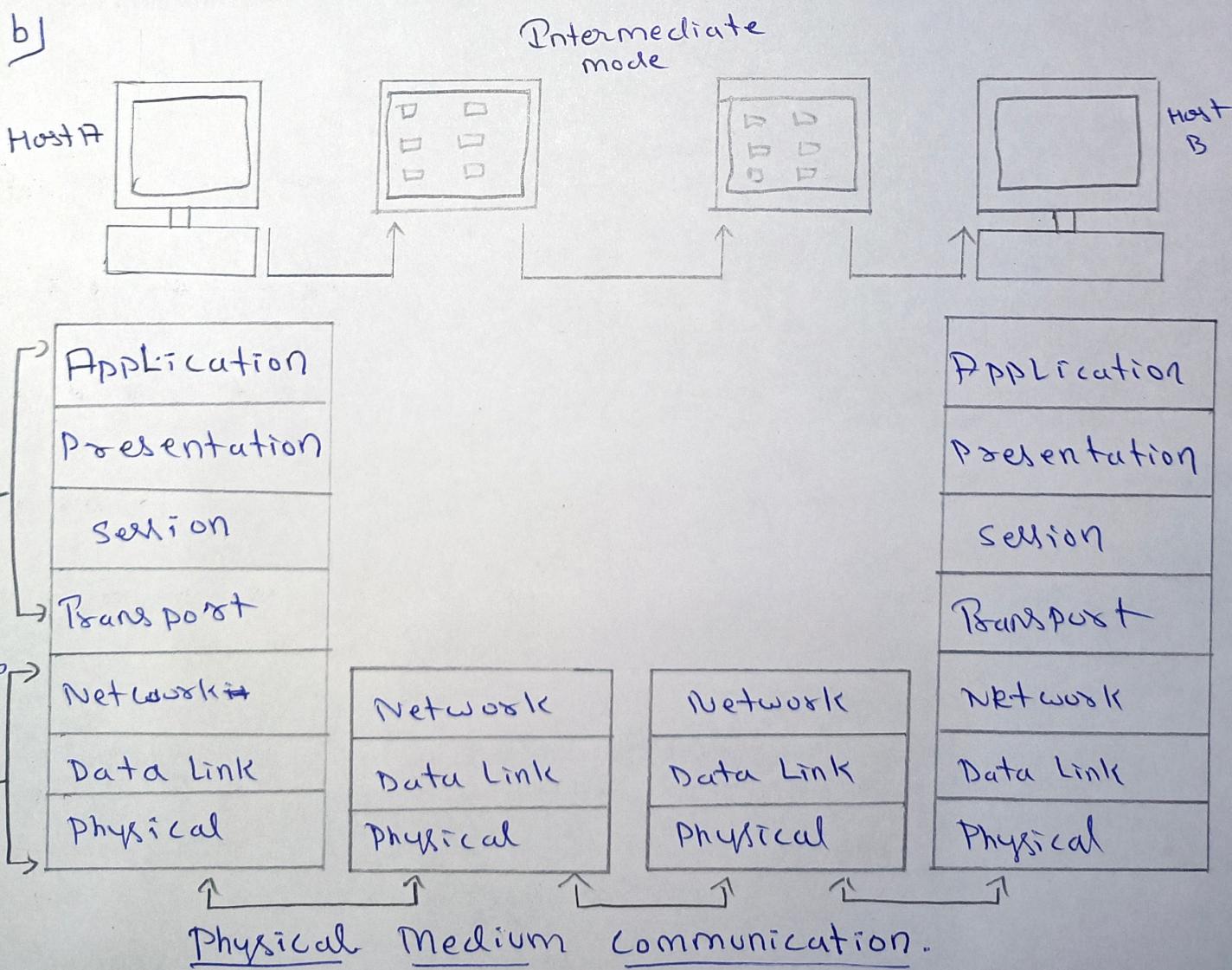
- The primary task of this Layer are :-
 - i] Addressing
 - ii] Sequencing of packets
 - iii] Congestion control
 - iv] Error handling
 - v] Internetworking
 - The protocol data unit associated with this Layer is referred to as a packet.
- b) Transport Layer :-
- This is a Layer 4 of the OSI model & is a host Layer.
 - It is tasked with end-to-end error recovery & flow control to achieve a transparent transfer of data between the hosts.
 - This Layer is responsible for keeping track of acknowledgements during variable-length data transfer between the hosts.
 - In case of loss of data, when no acknowledgment is received, the transport layer ensures that the particular error data segment is resent to receiving host.
 - The protocol data unit associated with this Layer is referred to as data.

Q14) a) List the Layers of OSI Model?

b) Draw the figure to show the networked communication between the two hosts following the OSI Model?

Ans: a) The Layers of OSI Models are:

- ① physical Layer
- ② Data Link Layer
- ③ Network Layer
- ④ Transport Layer
- ⑤ session Layer
- ⑥ Presentation Layer
- ⑦ Application Layer



Q15) Explain the following characteristics of IoT?

a) Dynamic & Self Adapting.

b) Self - configuring.

Ans a) Dynamic and Self Adapting:

IoT devices and systems have the capability to dynamically adapt with the changing contexts and take actions based on their.

- operating conditions
- user's context
- sensed environment

Ex: Surveillance System, comprising several surveillance cameras, surveillance camera can adapt their modes based on whether it is day or night mode. Camera can switch their modes from lower resolution to higher resolution when any motion is detected & alert nearby cameras to do the same.

b) Self Configuring:

IoT devices may have self-configuring capability allowing a large number of devices to work together to provide certain functionality.

Ex: Weather monitoring.

These devices have the ability to

- configure themselves
- setup networking
- fetch latest software upgrades with minimal manual or user interconnection.

Q16] Discuss the various applications of wearable electronics integrated with IoT.

Ans: Wearable electronics such as wearable gadgets & fashion gadgets provide various functions & features to assist us in our daily activities & making us lead healthy life styles.

Wearable gadgets are -

- Smart watches
- Smart-glasses
- Wrist band

Smart watches :- that run mobile operating systems provide enhanced functionality beyond just time keeping.

With smart watches the users can search the internet play audio/video files, make calls paired mobile phones), play games & use various kinds of mobile applications.

Fashion Electronics :- with electronics integrated in clothing & accessories.

Ex: Google-glass or Moto 360 smart watch

Smart glasses :- allows users

- To take photos & record videos
- Get map direction
- Check flight status
- Searches the internet by using voice commands

Smart shoes :

- Monitor the walking or running speeds
- Jumps with the help of embedded sensors & be paired with smart phones to visualize the data.

Q17] Discuss how IoT technology is integrated into modern smart appliances?

Ans: Modern homes have a number of appliances such as TVs, refrigerators, music systems, Washers / dryers etc.

- Managing & controlling these appliances can be cumbersome with each appliance having its own controls or remote controls.

★ Smart appliances

- Makes the management easier.
- Provide status information to the user remotely.

ex: Smart washers / dryers can be controlled remotely & notify when the washing / drying cycle is complete.

Smart thermostats : Allow controlling the temperature remotely & can learn the user preferences.

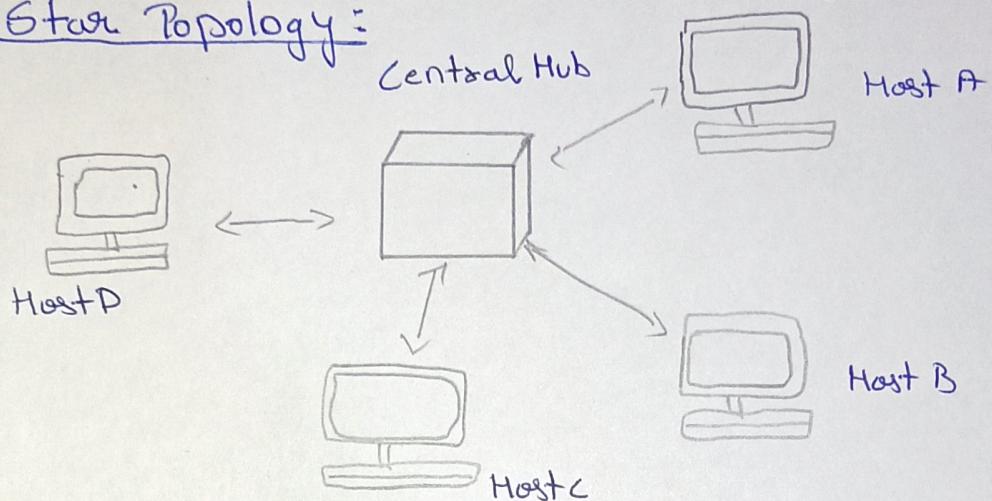
Smart refrigerators : Can keep track of the items stored & send updates to the users when an item is low on stock.

Smart TVs : Allows users to search & stream videos & movies from the internet or a local storage device. Search TV channel schedules & fetch news, weather updates & other content from the internet.

Open remote: P.t is an open source automation platform for homes & buildings & works with Standard Network

(Q18) Explain star and Mesh topology with neat diagram!

Ans: Star Topology:



- In star topology every host has a point-to-point link to a central controller or hub.
- The hosts cannot communicate with one another directly, they can only do so through the central hub.
- The hub acts as a network traffic exchange for large scale systems, the hub essentially has to be powerful server to handle all the simultaneously traffic following through it.

Advantages:

- This topology is cheaper and easier to set up.
- Ease of fault identification in the network.

Disadvantages:

- Danger of a single point of failure i.e if the hub fails, the whole network fails.

Q19] Describe the working of Request - Response BOT Communication Model?

Ans: Client

sends requests to server

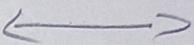
Request

Server

Receives request from client,
process requests,
Looks up/fetches
resources,
prepares response
& sends
response to clients

Response

Resources



Request response is a communication model in which the client sends requests to the server & the server responds to the requests.

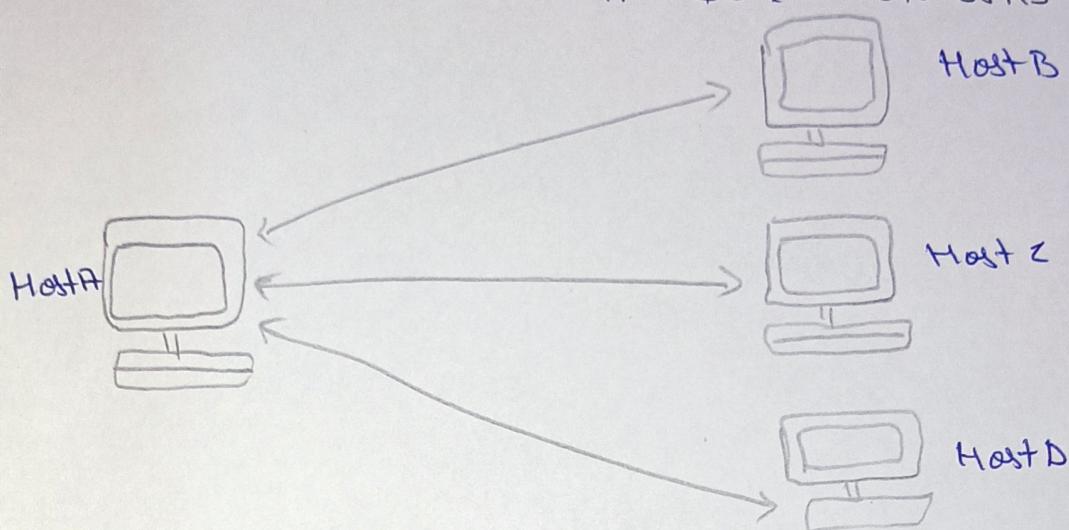
When the server receives the requests,

- It decides how to respond.
- Fetches the data.
- Retrieves resource representations.
- Prepares the response.
- Then sends the response to the client.

It is a stateless communication model & each pair is request-response pair independent of others.

Q20) Explain the concept of point-to-multipoint communication used in PON networks?

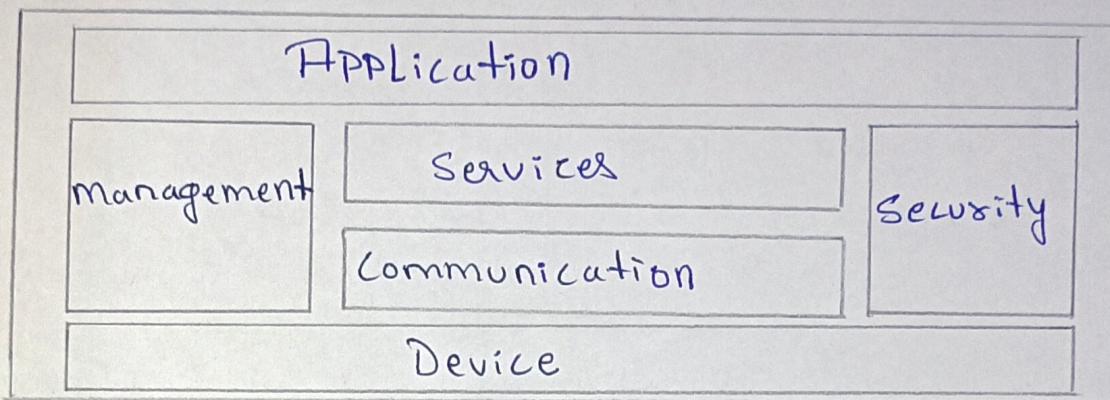
Ans:



- In point to multipoint connection more than two hosts share the same Link.
- This type of configuration is similar to the one-to-many connection type.
- The channel is shared between the various hosts either spatially or temporally.
- Scheme for spatial sharing is FDMA (Frequency division multiple access).
- Scheme for temporal sharing is TDMA (Time division multiple access).
- Point-to-multipoint connections find popular use in wireless networks & IP telephones.

Q2) With neat Diagram explain the functional blocks of IoT?

Ans:



An IoT system consists of a large number of functional blocks that provide the system the capability for identification, sensing, activations, communication & management.

The functional blocks are:

- ① Device
- ② Communication
- ③ Services
- ④ Management
- ⑤ Security
- ⑥ Application

- Device: An IoT system comprises of devices provide sensing, actuation, monitoring and control system and control functions.
- Services: An IoT system uses various types of IoT devices such as services for devices monitoring, devices control services, data publishing services & services for device history.

- Communication: It handles the communication for the IoT system.
- Management: It provides various functions to govern the IoT system.
- Security: This block secures the IoT system & provide functions such as authentication authorization, message and content integrity & data security.
- Application: IoT applications provide an interface that the users can use to control & monitor various aspects of IoT system.

Q22) List and explain the components of IoT networking?

A. The Components of IoT Networking are:

- | | |
|--------------|---------------|
| ① IoT mode | ④ IoT WAN |
| ② IoT router | ⑤ IoT Gateway |
| ③ IoT LAN | ⑥ IoT Proxy |

① IoT MODE :

- These are the networking devices within an IoT LAN.
- Each of these devices is typically made up of a sensor, a processor and a radio which communicates within the networks infrastructure.
- Nodes may be connected to other nodes inside a LAN directly or by means of a common gateway for that LAN.
- Connections outside the LAN are through gateway and proxies.

④ IoT Router:

- An IoT Router is a piece of networking equipment that is primarily tasked with the routing of packets both the various entities in the IoT Network.
- It keeps the traffic flowing correctly within the network.

⑤ IoT LAN:

- Local Area Network (LAN) enables Local connectivity within the purview of a single gateway
- They consists of short-range connectivity technologies.

⑥ IoT WAN:

- Wide area Network (WAN) connects various network segments such as LANs
- They are typically organizationally & geographically wide with their operational range lying between a few kilometer to hundreds of kilometer

⑦ IoT Gateway:

- An IoT Gateway is simply a router connecting the IoT LAN to a VAN or the internet
- Gateways can implement several LANs & WANs
- Their primary task is to forward packets b/w the LANs & WANs.

Q7) Bot Proxy:

- Proxies actively lie on the application Layer & performs functions between the Bot model & other activities.
- Application Layer proxies are a mean of providing security to the network entities under it, it helps to extend the addressing of the network.

Q23) Explain the Internet protocol suite in detail & illustrate its Layered architecture with a neat diagram?

A. Internet protocol suite is the conceptual frame work that provides levels of abstraction for ease of understanding & development of communication.

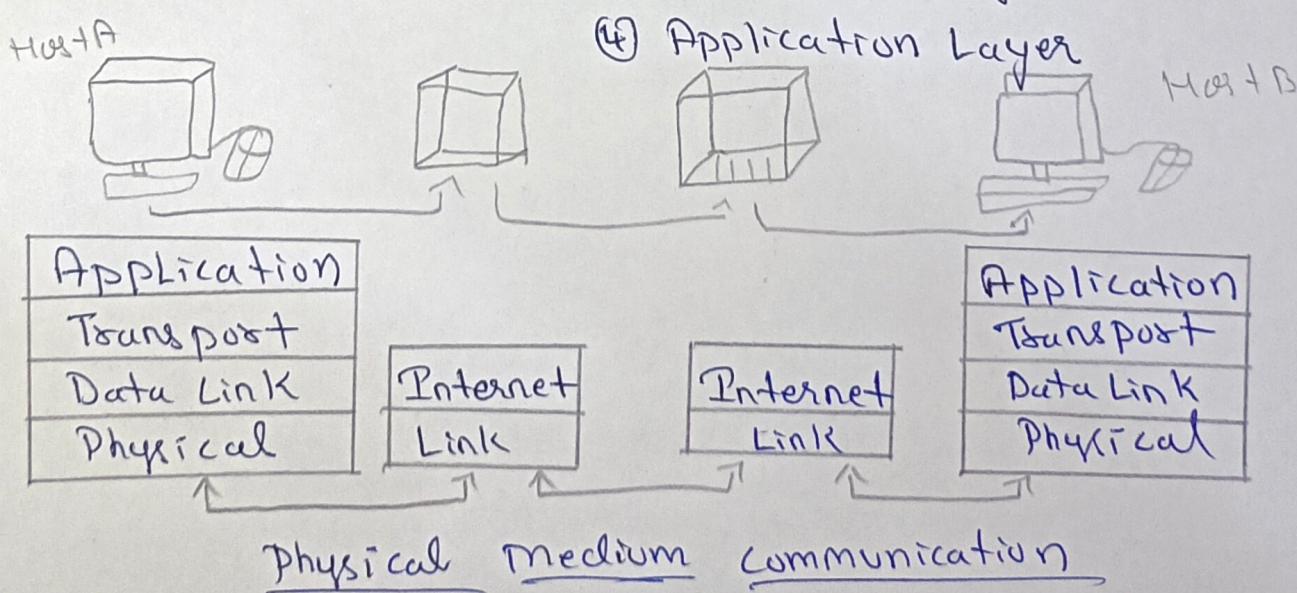
• It is also called as TCP/IP suite

• It has 4 Layers → ① Link Layer

② Internet Layer

③ Transport Layer

④ Application Layer



① Link Layer:

- The first & base layer of the TCP/IP protocol suite is also known as the Network Interface Layer.
- It is similar to physical & data link layer of OSI model.

② Internet Layer:

- It is similar to network layer of OSI model & is responsible for addressing, address translation, data packaging, data disassembly & assembly, routing and packet delivery, ARP, IP, ICMP.

③ Transport Layer:

- It is similar to the transport layer of OSI model.
- It is tasked with the functions of error control, flow control, segmentation & addressing in an end-to-end manner & is independent of the underlying network.

The core protocols used are:

- ① Transport control protocol (TCP)
- ② User datagram protocol (UDP)

④ Application Layer:

The functionalities of application layer are similar with collective functionalities of OSI model's session, presentation & application layer.