

NAS 27/09/2007

20 Questions

1.

(a) Why do you study data communication?

(b) What is the difference between computer network and data communication?

(c) What is the relationship between computer networks and internet? Explain the application of communication and computer networks.

2.

(a) What is the basic of computer networking?

(b) Explain the benefit of networking.

(c) Describes the types of network.

(d) Why do you need networking?

(e) What is the difference between network and internetwork?

3. (a) what is the most popular LAN Technology used today? 3

(b) what is LAN protocol? How does virtual LAN work? 4

(c) what are the purposes of VLAN?

what is the difference between VLAN and LAN? (3+4)

bms with reference to networking

(E+S) 4. (a) Define Network topology. 3

(b) Describe the types of network topology. 8

(c) Which network topology is best? 3

5. (a) Define computer network model. 3

(b) why do you need network models? (3+2)

why network is divided into layers. (3)

(c) briefly describe the OSI model in computer networks. 6

QUESTION How does network security work? 4

(a)

(b) why cryptography is needed for network security ? what is information security into cryptography? (3+2)

(c+e)

(c) what is the goal of cryptography

How do you use cryptography today? (2+3)

QUESTION What operates at the application layer? what is an HTTP Application

(c+e)

(c) layer? (3+2)

(b) what is client-server security?

Advantage and disadvantages of client-server models. (2+3)

(c)

How the browser interacts with the server. (4)

Q8(a) what is an application layer protocol?

Ans with example (4)

(b) what is the use of DNS in networking? what is the use of NTP.

(2+2)

(c) what are the services provided by computer network which is the most popular network service?

(3+3)

? What are the services provided by computer network?

Ans: Web server, mail server, file server, print server, database server.

(4)

ANSWER

(a) Why do we study data communication?

Ans: We have moved into an information

society dominated by computers, data communications etc.

The key technology of the information

age is communications. Data communications

and networking is a truly global area of

study, both because of the technology enables

global communication, and new technologies and

applications often emerge from a variety

of countries and spread rapidly around

the world. A system of interconnected

computers and computerized peripherals

such as printers is called computer

network. This interconnection among computer

facilities sharing information among them.

Facilities for sharing information among them.

In a word, data communication transfer the digital data between two or more computers and computer networks or data network.

network is a telecommunication system that allows computers to exchange data.

For this we study data communication.

Q. What is the difference between computer network and data communication?

Ans:

Computer network	Data communication
Computer network is best known to transfer the data and information across different geographies.	We can easily communicate and transfer the data across different nodes through data communication.
Computer networks have different types of architectural layers for example client-server, peer to peer or hybrid	Data communication usually have 3 architectural design and can be useful in the multi nodes transmission

computer network

The purposes of communication and resource sharing is achieved by multiple computers linked through transmission media.

A large community supports by computer networks and extensive documentation libraries.

The different set of transmission methodsologies across different locations and regions through computer networks.

Data communication

Through the network we can transmit the data signals from one point to another.

Data communication also has one of the largest community supports.

There are three layers of transmission approaches and different sets of wireless methodologies for the data communication.

1.(c) what is the relationship between computer networks and the internet?

Explain the application of communication

and computer networks in various

spans of time.

Ans: The network is a collection of

devices that can communicate with each

other. On the other hand, the internet

is a collection of networks that can

communicate with each other. The network

is a structure when two or more

than two computers are connected to

exchange data and information.

Application of communication and computer

Networks

- Exchange of information by means of e-mails and FTP.

- Information sharing by using web or internet.
- Interactions with other users using dynamic web pages.
- video conferences
- parallel computing
- Instant messaging
- Resource Sharing such as printers and storage devices.

Q2(a) What is the basic computer networking? Explain the benefit of networking.

Ans: Computer networks share common devices, functions, and features including

servers, clients, transmission media, shared data, shared printers and other hardware

and software resources, network interface card, local operating system and the

network operating system.

→ Benefit of networking: Exchanging information

on challenges, experiences and goals is a

key benefit of networking because it

allows you to gain insights that you

may not have otherwise thought of.

Similarly, offering helpful ideas to a contact

is an excellent way to build your

reputation as an innovative thinker.

Q(6) Describe the types of computer networks.

Ans: A computer network is mainly

four types:

- LAN
- PAN
- MAN
- WAN

*** LAN means Local Area network.

A local area network is a group of computers connected to each other in a

small area such as building, office etc.

LAN is used for connecting two

or more personal computers through a

hub or a switch.

data communication medium such as twisted pair coaxial cable etc.

- Local area networks provides higher security
- The data is transferred at an extremely faster than any networks.

* * * PAN means personal Area network.

- Personal Area network is a network

arranged within an individual person.

typically within a range of 10 meters.

- Thomas Zimmerman was the first researcher to bring the idea

of the personal Area network.

personal Area network covers an area

of about 30 feet around the user or

and provides

before we have wireless personal area network has two types:

- i. nonwired personal area network based on short range wireless technology.
- ii. wireless personal area network based on short distance communication.

*** MAN - Metropolitan Area Network.

Metropolitan area network is a network that covers a larger geographic area.

by interconnecting a number of LAN from a large area network.

Government or agencies use MAN to connect to the citizens and private industries.

In MAN, various LANs are connected to each other through a telephone exchange line.

• MAN MAN is used in communication between the banks in a city. Also it can be used in Airline Reservation.

* * * WAN means Wide Area Network.

• A wide Area network is a network that extends over a large geographical area such as states or countries.

• A wide Area network is quite bigger than the LAN.

• The internet is one of the biggest WAN in the world.

• A wide Area network is widely used in the field of business, government and education.

Q2(c) why do you need internetworking?

What is the difference between networking and internet work.

Ans: Internet working ensures data communication among networks owned and operated by different entities using a common data communication protocol.

Internet working is only possible when all the connected networks use the same protocol stack or communication methodologies.

The same protocol stack or communication methodologies.

Application methodologies.

Difference between network and internetwork has been explained

A internet is defined as a group of locally connected computers such as computer connected in an office building.

2.03

On the other hand An internetwork is a collection of individual networks, which are interconnected by intermediate networking devices, connected by some functions as a single large network. Internetworking has evolved some problems such as isolated LANs, Duplication of resources, absence of management.

Ques. 3.(a) What is the most popular LAN Technology used today?

Ans. The most widely used LAN Technology is Ethernet and it is specified in a standard called IEEE 802.3.

Ethernet uses a star topology in which the individual nodes (devices) are networked with one another via active networking equipment such as switches.

The number of networked devices in a LAN may range from two to several thousand.

Ethernet connector is, network interface card equipped with 48-bits MAC address.

This helps other Ethernet devices to identify and communicate with remote devices in Ethernet.

Q3(b) What is LAN protocol? How does it work?

Ans: LAN protocol typically uses one of two methods to access the physical network medium. There are many LAN protocols in use today. Some of the more common ones are Ethernet, Asynchronous Transfer mode (ATM), Token Ring

and fiber distributed data interface.

Ethernet is a LAN protocol that can be found in most organizations.

Working principle of virtual LAN:

Virtual Local Area Network (VLAN)

separate an existing physical network

into multiple logical networks. Thus, each

VLAN creates its own broadcast

domain. Communication between two VLANs

can only occur through own router

that is connected with both VLANs

work as though they are created

using independent switches.

virtual LAN provides solution of divided

a single broadcast domain into multiple

broadcast domain. Host in one VLAN

cannot speak to a host in another.

Q3(c) what are the purposes of VLAN?

what is the difference between VLAN
and LAN

and what is the difference between LAN and
VLAN

DATA loss in LAN is less than in VLAN

DATA loss in VLAN is more than in LAN

Ans: purposes of VLAN: VLANs allow network administrators to automatically limit access to specified group of users by dividing workstations into different isolated LAN segments. When user moves in their workstations, administrators don't need to reconfigure the network.

or change VLAN groups.

VLAN has been created

and now it is used

for negative

Differences between LAN and VLAN:

LAN	VLAN
LAN stands for Local Area Network.	VLAN stands for virtual Local Area Network.
The cost of Local Area Network is high.	The cost of virtual Local Area network is less.
The latency of Local Area network is high.	The latency of virtual Local Area network is low.
The devices which are used in LAN are: Hubs, Routers and switches.	The devices which are used in VLAN are: Bridges and switches.

PLAN	PIRATION	VLAN
In Local Area Network, the packet is advertised to each device.		In virtual local area networks, packet is send to specific broadcast domain.
Local Area network is less efficient than virtual network as virtual network is greater efficient than local network.		

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4 (a) Define Network topology

Ans: Network topology is the way
a network is arranged, it includes
the physical or logical description
of how links connect nodes and
how to relate to each other. There
are numerous ways a network can
be arranged, all with different
pros and cons, and some are more
useful in certain circumstances than
others.

In other words, Network topology is
the arrangement of the elements
(links, nodes, etc) of a communication
network.

4(b) Describe the types of Network Topology.

ANS: There are six types of topology in computer networks.

- i. Bus Topology
- ii. Ring Topology
- iii. Star Topology
- iv. Mesh Topology
- v. Tree Topology
- vi. Hybrid Topology.

of bus topology: Bus topology is a network type in which every computer and

network device is connected to single cables. When it has exactly two endpoints, then it is called linear bus topology.

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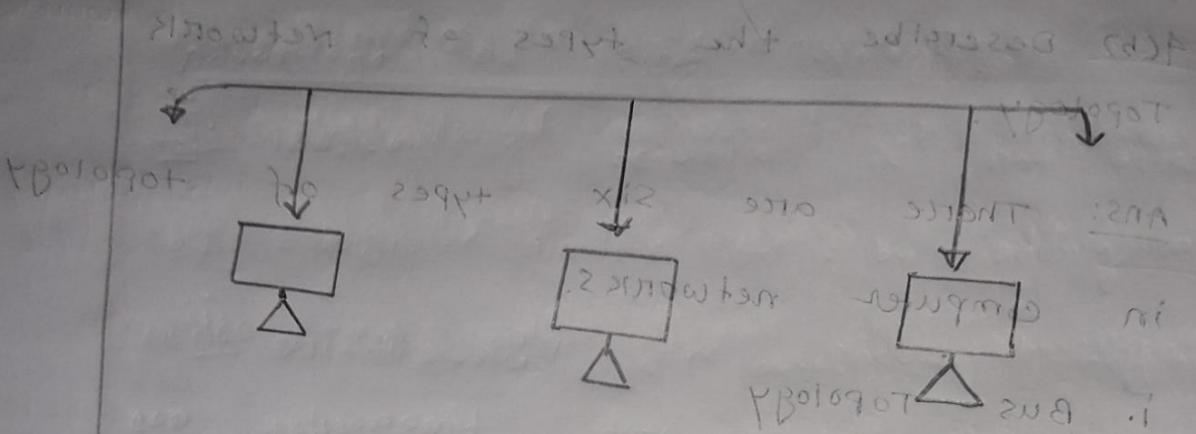


Figure: Bus Topology Page .ii
Bus Topology Page .iii

Features of Bus Topology.

- i. It transmits data only in one direction.
- ii. Every device is connected to a single cable.

Advantage of Bus Topology:

- i. It is cost effective.
- ii. Used in small networks.
- iii. Easy to expand joining two cables together.

Disadvantages of Bus topology:

i) If cables or fails then whole network fails.

ii) cable has a limited length.

iii) difficult to find a故障 (fault).

Ring Topology: It is called ring topology

because it forms a string around each

computer is connected to another

computer with the last one connected to the first. Exactly two neighbours

for each device.

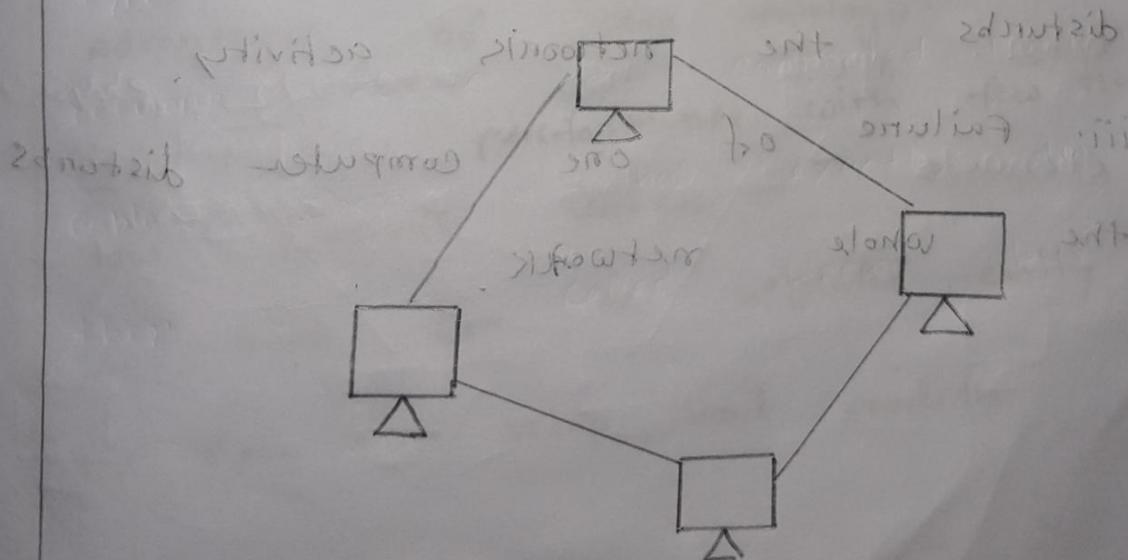


Fig: Ring Topology.

Advantages of Ring Topology:

i. Transmitting network is not affected by high traffic or by adding more nodes, as only the nodes having tokens can transmit data.

ii. Cheap to install and expand.

Disadvantages of Ring topology:

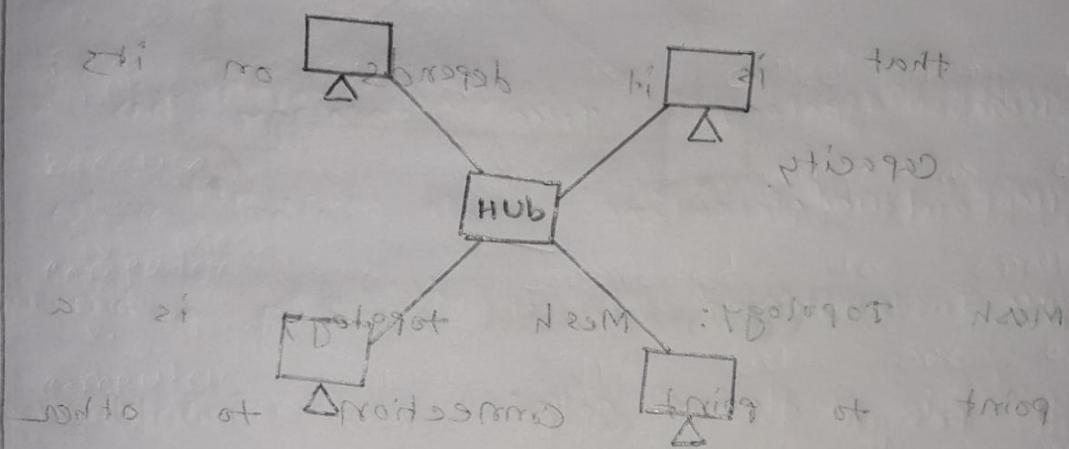
i. Troubleshooting is difficult in ring topology.

ii. Adding or deleting the computers disturbs the network activity.

iii. Failure of one computer disturbs the whole network.

STAR TOPOLOGY In this type of topology all the computer are connected to a single hub through a cable.

Adv ant no need of switch



Disadv ant. If a node fails then whole network fails

Fig: star topology.

Nodes of becomes are error

Advantages of star topology:

Working in (n-1) n star network with few nodes and

- i. Fast performance with low network traffic.

ii. Hub can be upgraded easily.

- iii. Easy to setup and modify.

disadvantages of star topology:

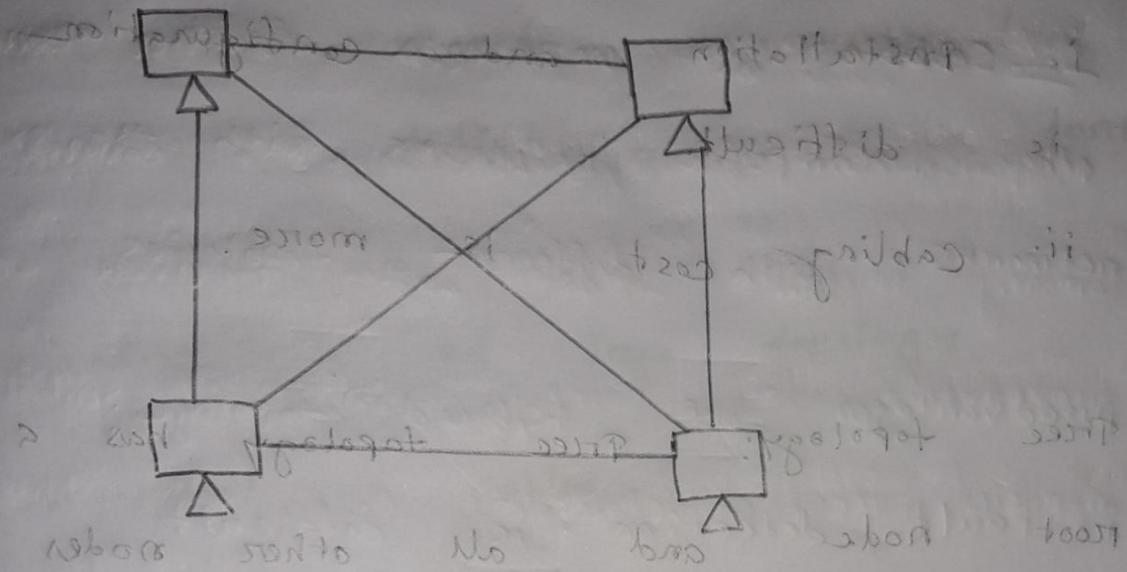
- i) cost of installation is high.
- ii) expensive to use due to signal loss.
- iii) performance is based on the hub that is it depends on its capacity.

Mesh Topology: Mesh topology is a point to point connection to other nodes or devices. All the network nodes are connected to each

other. Mesh has $n(n-1)/2$ physical channels to link n devices.

Lines connecting to each other

will be center of mesh i.e.



information is exchanged in mesh topology.

advantage of mesh topology:

- i Each connection can carry its own data load.
- ii: It is robust
- iii: provides security and privacy.

Disadvantage of Mesh topology:

- i. Installation and configuration is difficult.
- ii. cabling cost is more.

Tree topology: Tree topology has a root node and all other nodes are connected to it forming a hierarchy.

It is also called hierarchical topology.

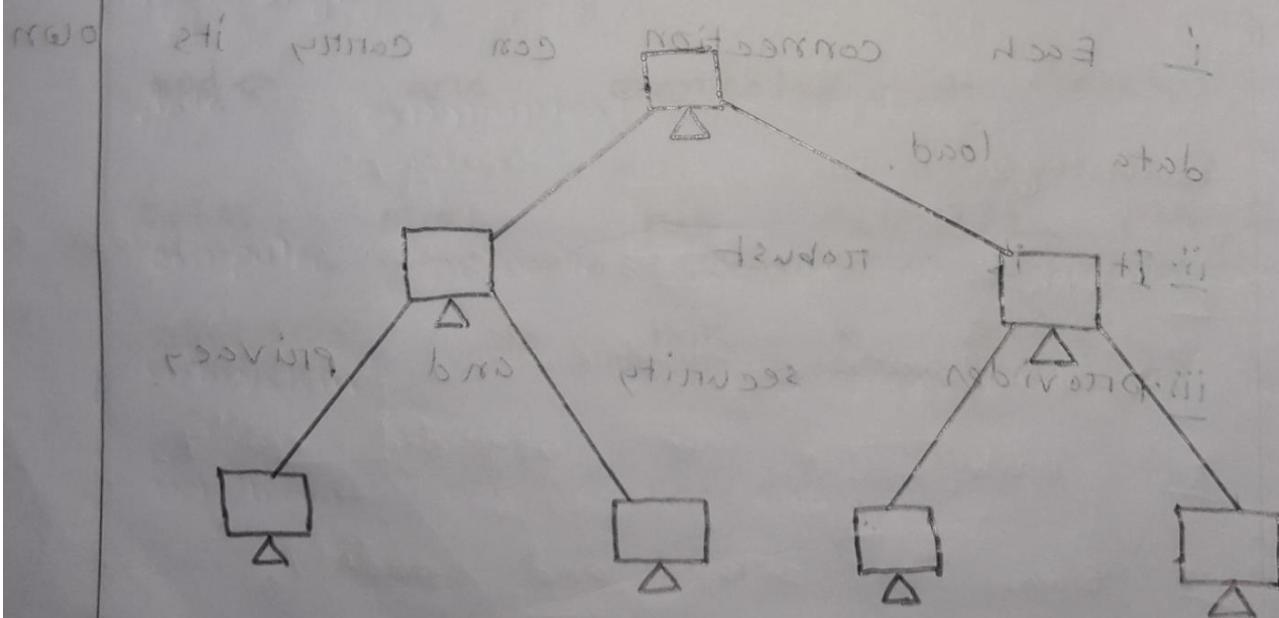


Fig: Tree topology.

Advantages of Tree topology:

Advantages: Easily managed and maintained.

Error detection is easily done.

Disadvantages of Tree topology:

Topological bottleneck at the root node.

1. Heavily cabled.

2. costly.

3. central hub fails, network fails.

Hybrid Topology: A combination of

two or more topology is known as

hybrid topology. for example, a combination

of star and mesh topology

is known as hybrid topology.

Advantages of hybrid topology:

- i. Scalable as we can further connect other types of computer networks with the existing networks with different topologies.

Disadvantages of hybrid topology:

- i. Fault detection is difficult
- ii. Installation is difficult
- iii. Design is complex so maintenance is high thus expensive.

4(c) which network topology is best?

Ans: Star network Topology is best

suited for smaller networks and works

efficiently when there is limited number of nodes.

If one node has to ensure that the hub or the central node is always

working and extra security features

should be added to the hub because

it is the heart of the network.

Also data can be transferred at fastest speed in star topology.

for example in a network

if one node goes down then whole

S-4(a) Define Computer network models.

+ Ans: Computer network models are responsible for establishing a connection between two stations or sender and receiver and transmitting the data in a smooth manner respectively.

There are two computer network

models such as OSI model and

TCP/IP models in which the whole

data being communication relies

computer network works as a communication

Subsystem is a complex piece of hardware and software.

5(b): Why do you need network models?

Why network is divided into layers?

Ans: The main purposes of having several layers in a computer or network model is it's to divide a process of

sending and receiving data into small tasks. It these layers are connected with each other, each layer provides certain data to its immediate higher and immediate lower layer and receives certain

data from the same.

Network models also helps you to determine how a specific computer should be connected to the internet and how data should be transmitted between them.

Network Segmentation into layers:

To ease network engineering, the

whole networking concept is divided

into multiple layers. Each layer is

involved in some particular task

and is independent of all other

layers. But as a whole, almost

all networking tasks depend on all

of these layers.

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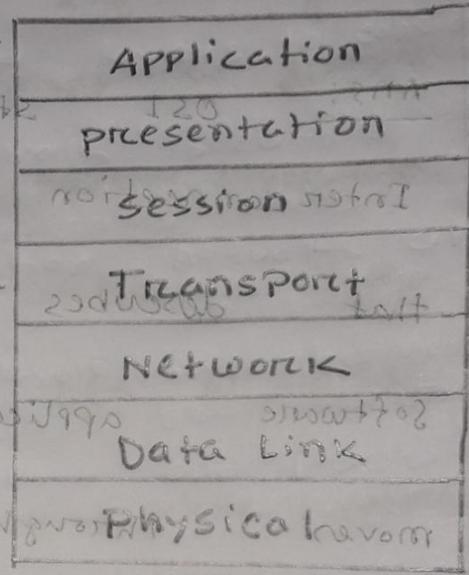
5(c). Briefly describe the OSI model in computer networks.

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. The OSI model is a seven-layered model and each layer performs a particular function.

Characteristics of OSI Model:

Master Responsibility of the host

User Responsibility of the network



Users of OSI Model: IT professionals

Users of OSI model trace data is sent or received to over a network

This model break down data

transmission over a series of seven layers, each of which is responsible

for performing specific tasks concerning sending and receiving data.

Purposes of OSI model:

The original objective of the OSI model was to provide a set of design standards for equipment manufacturers so they could communicate with each other. The OSI model defines a hierarchical architecture that logically partitions the functions required to support system to system communication.

Locating optimum location nearby
of hospitals and platforms which

Ques. How does network security work?

Ans: There are many layers to consider when addressing network security.

When addressing network security, it is important to consider the following layers:

Physical layer: This layer includes physical components such as cables, connectors, and hardware.

Link layer: This layer includes protocols such as Ethernet and Wi-Fi.

Network layer: This layer includes protocols such as IP and TCP.

Transport layer: This layer includes protocols such as UDP and TCP.

Session layer: This layer includes protocols such as SSL/TLS and SSH.

Data link layer: This layer includes protocols such as IEEE 802.11 and IEEE 802.3.

Application layer: This layer includes protocols such as HTTP, FTP, and SMTP.

Network security typically consists of three different controls: physical, technical, and administrative.

Physical network security: Physical security controls are designed to

Prevents unauthorized personnel from gaining physical access to network components such as routers, cabling cupboards and so on.

Technical networks security: Technical security controls protect data that is stored on the network or which is in transit across into or out of the network.

Administrative networks security: Administrative security controls consist of security policies and processes that control user behaviour, including how user are authenticated, their level of access and also how IT staff members implement changes to the infrastructure.

G(b): why cryptography is needed before network of security? what is information security in cryptography?

Ans: In data and telecommunications,

cryptography is necessary when

communicating over any entrusted

medium, which includes just about any

network particularly the internet.

Cryptography, then, not only protects

data from theft or alteration,

but can also be used for user

authentication.

Information security in cryptography:

Information security uses cryptography to

transform usable information into a

useful or valuable

form that renders it unusable by anyone other than an authorized user, this process is called encryption.

↳ What is Cryptography?

Q. What is the goal of cryptography?

Q. How do you use cryptography today?

Ans: Cryptography is the science of using mathematics to encrypt and decrypt sensitive information or data. Cryptography enables you to store sensitive information or transmit it across insecure networks (like the internet) so that it cannot be read by anyone except the intended recipient.

- Data privacy
- Data Authenticity

Data integrity is maintained by using cryptography today.

- Modern cryptography uses sophisticated mathematical equations (algorithms) and secret keys to encrypt and decrypt data. Today, cryptography is used to provide secrecy and integrity to our data and both authentication and anonymity to our communications.
- Authentication and digital signatures are a very important application of public key cryptography.

7(a) what happens at the application layer?

What is an HTTP Application layer?

Ans: Application layer specifically, this layer deals with protocols such as

FTP and Telnet that relate to the handling of IP traffic. Web browsers,

SNMP protocols and HTTP protocols or HTTPS

Successor to HTTP's are other examples of application layer systems.

HTTP Application layer: HTTP is an extensible protocol which has evolved over time.

Protocol that is sent over TCP or over a TLS-encrypted TCP connection, though

any reliable transport protocol could

theoretically be used. (Q5)

Q(b). what is client to server network

security, advantages and disadvantages
of client server models.

Ans: A client server network security
is a dedicated computer that controls
client server network resources and
serves other computers on the network.

The client receives the requested

services from the computer client

server network examples.

Advantages of client to server model:

- Centralized back-up is possible in

client-server networks.

disadvantages of client server network

These models are more secure as all the shared resources are centrally administered.

The use of the dedicated server increases the speed of sharing resources.

This increases the performance of the overall system.

Disadvantages of client-server network:

Traffic congestion is a big problem in client server model network.

It does not have a robustness of a network, when the server is down then the client requests cannot be met.

With this kind of network, the server becomes a bottleneck.

Q(c) How the browser interacts with the servers?

Ans:

few steps to follow to interact with the servers.

Let's see what are the steps to interact with the servers.

- User enters the URL of the website on file.

The browser then request the DNS.

DNS server looks for the address of the web server.

Browser sends over an HTTP / HTTPS request to the web server's IP.

Server then sends over the necessary files of the website.

Browser then renders the files and the website is displayed.

8(a) What is Application layer protocol?
with example.

Ans: An Application layer protocol

defines how application processes (clients and servers) running on different end systems pass messages to each other. In particular, works for user.

Application layer protocols :

- TELNET

- FTP

- TFTP

- NFS

- SMTP

- LPD

- DNS

- HTTP

- BBS

Ques 8(b) what is the uses of DNS in networking? what is the use of DNS?

Ans: The domain name system(DNS).

The domain name system(DNS).

converts human readable (domain names

like (www.google.com) into internet

protocol (IP) addresses (like: 168.127.30.28)

uses of FTP: FTP is an acronym

for file transfer protocol. As the name

suggests, FTP is used to transfer

files between computers on a network.

You can use FTP to exchange files

between computer accounts, file transfer

files between an account and a

Desktop computer are access online software archives.

Q8(c) what are the services provided by computer networks which is the most popular network service?

Ans. Computer networks support enormous number of applications and services such as access to the world wide web, shared use of digital video, digital audio, and storage servers, printers, application and fax machines, and use of email and messaging applications as well and instant messaging.

many others.

- Directory services Authentication and Authorization, Domain Name services.

• File sharing, file transfer.

Communication services: Email, Social Networking, Internet Chat, Remote Access.

APPLICATIONS: Resource sharing, EMA

Databases, web services.

The most popular network service: The Electric mail (e-mail) is the most popular and widely used network service.

can be viewed as the equivalent to a regular mail letter.

Therefore, many more people can be reached by e-mail than are connected to the internet via TCP/IP.