



CT-01

CT-01 : Question And Answer On DCN Tutorial And Application Layer

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Class Test - 01

Question And Answer on DCN Tutorial and Application Layer.

Q1. What is the purpose of Domain Name System? Discuss the three main division of the domain name space.

Ans:

Domain name system can map a name to an address and conversely an address to name.

Discussion about the three main division of the domain name space:

The three divisions of the domain name are:

1. Generic domain
2. Country domain
3. Inverse domain.

Now we are going to discuss briefly about these three divisions.

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Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.

Top Country domain:

Uses two characters to identify a country or the last suffix.

Top Inverse domain:

Find the domain name given the IP address.

Q) Discuss about the TCP/IP Application Layer Protocols.

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Ans:

The most widely known TCP/IP application layer protocols are those that provide the exchange of user information. These protocols specify the format and control information necessary for many of the common Internet

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Communication functions. Among these TCP/IP protocols are following:

- इ Domain Name System (DNS) is used to resolve Internet names to IP address.
- इ Hypertext Transfer Protocols (HTTP) is used to transfer files that make up the web pages of the world wide web.
- इ Simple mail transfer protocol (SMTP) is used for the transfer of mail messages and attachments.
- इ Telnet, a terminal emulation protocol, is used to provide remote access to servers and networking devices.
- इ File Transfer Protocol, is used to provide remote access to file for interactive file transfer between systems.

The protocols in the TCP/IP suite are generally defined by Request for Comments (RFC)

Q4

The Internet Engineering Task Force (IETF) maintains the RFCs as the standards for the TCP/IP suite.

- ⑥ Give a short information about Session layer.
Discuss about the ~~the~~ three functions about ~~5~~ presentation layer.

Ans:
Session Layer:

Functions at the session layer create and maintain dialogs between source and destination application. The session layer handles the exchange of information to initiate dialogs and keep them active, and to restart sessions that are disrupted or idle for a long period of time.

The presentation layer has three primary functions:

⑥ Coding and conversion of application layer data to ensure that data from

Q5

The source device can be interpreted by the appropriate application on the destination device.

Q6 Compression of the data in a manner that can be decompressed by the destination device.

Q7 Encryption of the data for transmission and decryption of data upon receipt by the destination.

Q2.

a) Discuss about the OSI and TCP/IP Model with a proper figure.

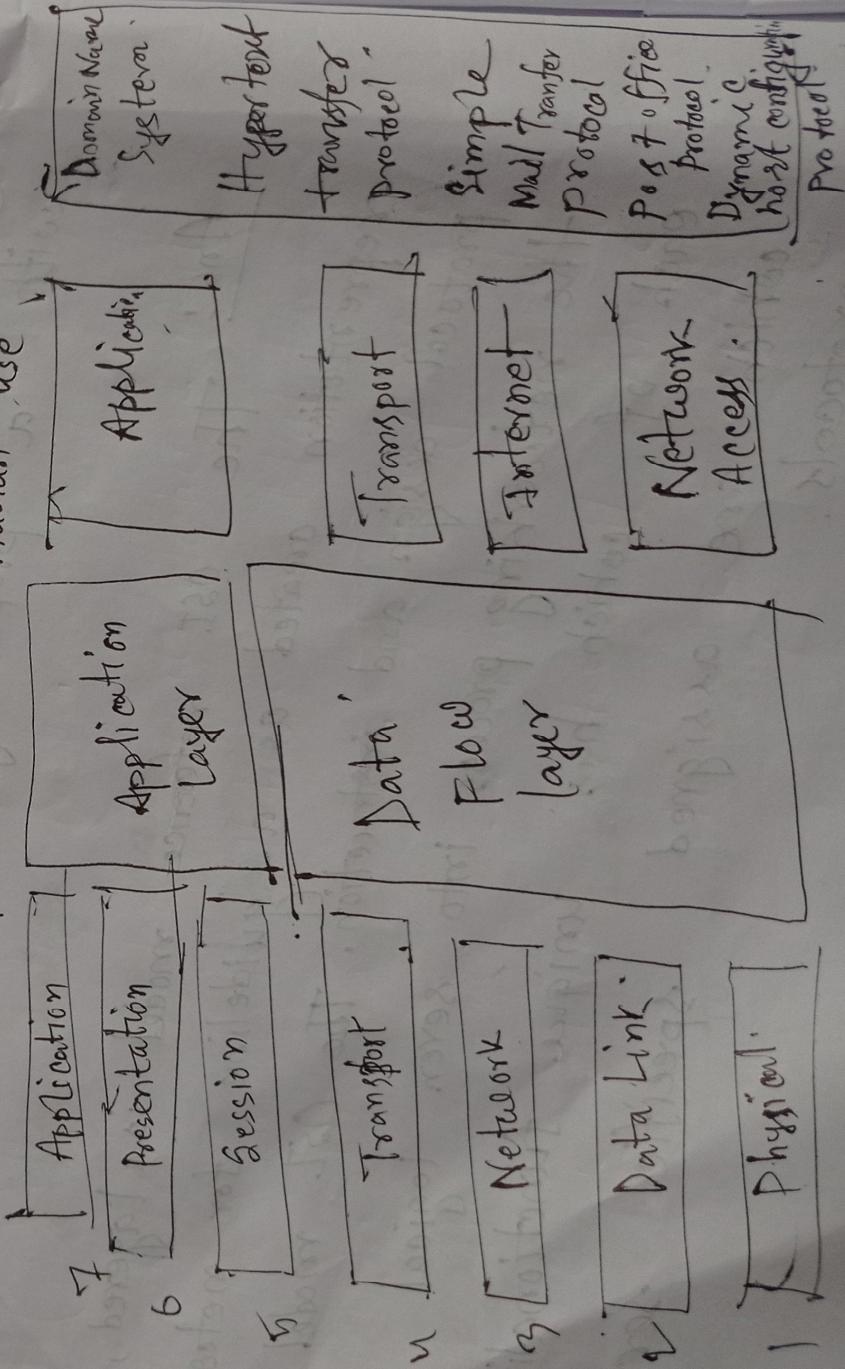
Ans: The OSI reference model is a layered, abstract representation created as a guideline for network protocol design and instruction. The OSI model divides the networking process into seven logical layers, each of which has unique functionality and to which are assigned specific services and protocols.

Q

The following explains the six steps:

1. People create the communication.
2. The application layer prepares human communities.
3. Software and hardware convert communication to a digital format.
4. Application layer services initiate the data transfer.
5. Each layer plays its role. The OSI layers encapsulate data down the stack.

6. The application layer receives data from the network and prepares it for human use.



⑥ Discuss Client - Server Model with proper figure.

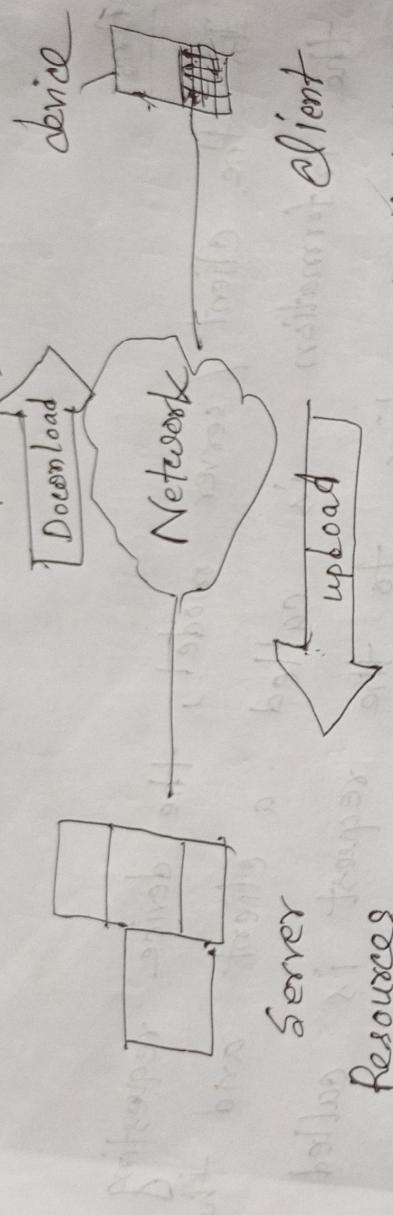
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Ans:

In the client / server model, the device requesting the information is called a client and the device responding to the request is called a server. Client and server processes are considered to be in the application layer. The client begins the exchange by requesting data from the server, which responds by sending one or more streams of data to the client. Application layer protocols describe the design of the requests and responses between clients and servers. In addition to the actual data transfer, this exchange can require control information, such as user authentication and the identification of a data file to be transferred.

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8. Files are downloaded from the server to the client



Files are stored on the server

Files are uploaded from the client to the server.

A client is a hardware / software combination that people use directly.

03

a) What is the function of SMTP?

Ans: The TCP/IP protocol supports electronic mail on the internet is called Simple Mail Transfer (SMTP). It is a system for sending messages to other computer users based on email addresses. SMTP provides mail exchange between users on the same or different computers.

Q) How does MIME enhance SMTP? 4

Ans:

MIME is a supplementary protocol that allows non-ASCII data to be sent through SMTP. MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers it to the client SMTP to be sent through the internet. The (server) SMTP at the receiving side receives NVT ASCII data and delivers it to MIME to be transformed back to the original data.

Q) Describe about the E-mail services and SMTP/POP protocols.

E-mail services include POP, SMTP, and IMAP. POP (Post Office Protocol) is used for retrieving messages from a server. SMTP (Simple Mail Transfer Protocol) is used for sending messages. IMAP (Internet Message Access Protocol) is used for accessing messages from a server.

(Q10)

Ans:

E-mail, the most popular Network

service, has revolutionized how people communicate through its simplicity and speed. Yet to run on a computer or other end device, e-mail requires several application and services.

Two examples of application layer protocols you only

are post office protocol and simple Mail

Transfer Protocol (SMTTP). As with HTTP,

these protocols define client / server processes.

POP and POP3 are inbound mail delivery

protocols and are typical client / server protocols.

They deliver email from the mail server to the client MUA.

SMTTP, on the other hand, governs the

⑪ transfer of outbound email from the sending client to the email servers (MUA), as well as the transport of email between email servers (MTA).

SMTTP enable to emails to be transported across data network & between different types of server and client software and makes email exchange over the internet possible.

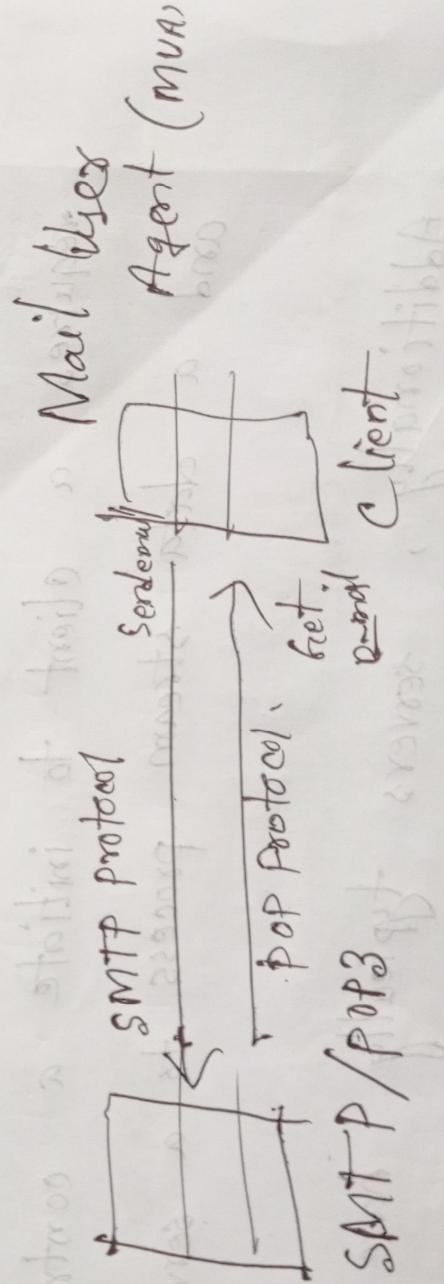


Figure: E - Mail Client (MUA).

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Q4. Discuss about Multiple clients Service Request.

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Ans.

A single application can employ many different supporting application layer services. Thus what appears to the user as one request for a web page might, in fact, amount of dozens of individual requests. For each request, multiple processes can be executed. For example, the ~~file~~ FTP requires a client to initiate a control process and a data stream process to a server.

Additionally, servers typically have multiple clients requesting information at the same time, as shown in figure of multiple client's service request. For example, a Telnet server can have many clients requesting connections to it. These individual client requests

Q3

must be handled simultaneously and separately for the network to succeed. The application layer processes and services rely on support from lower-layer functions to successfully manage the multiple conversations.

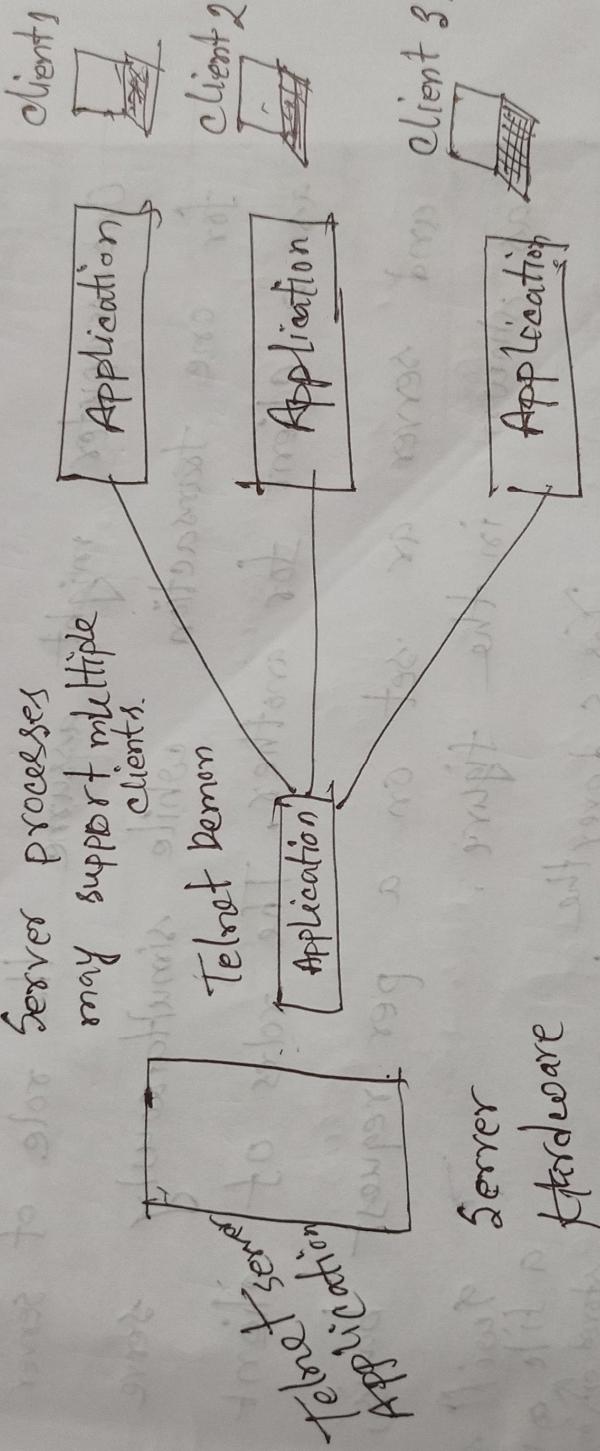


Figure 3. Multiple Clients Service Requests.

- b) Discuss about Peer-to-Peer (P2P) Networking and its Application.

7.

Ans: P2P Network

In a peer-to-peer network, two or

Q14

more computers, are connected through a network and can share resources such as printers and files without having a dedicated server. Every connected end device, known as a peer, can function as either a server or a client.

One computer might assume the role of server for one transaction while simultaneously serve as a client for another. The roles of client and server are set on a per request basis, as shown in the figure.

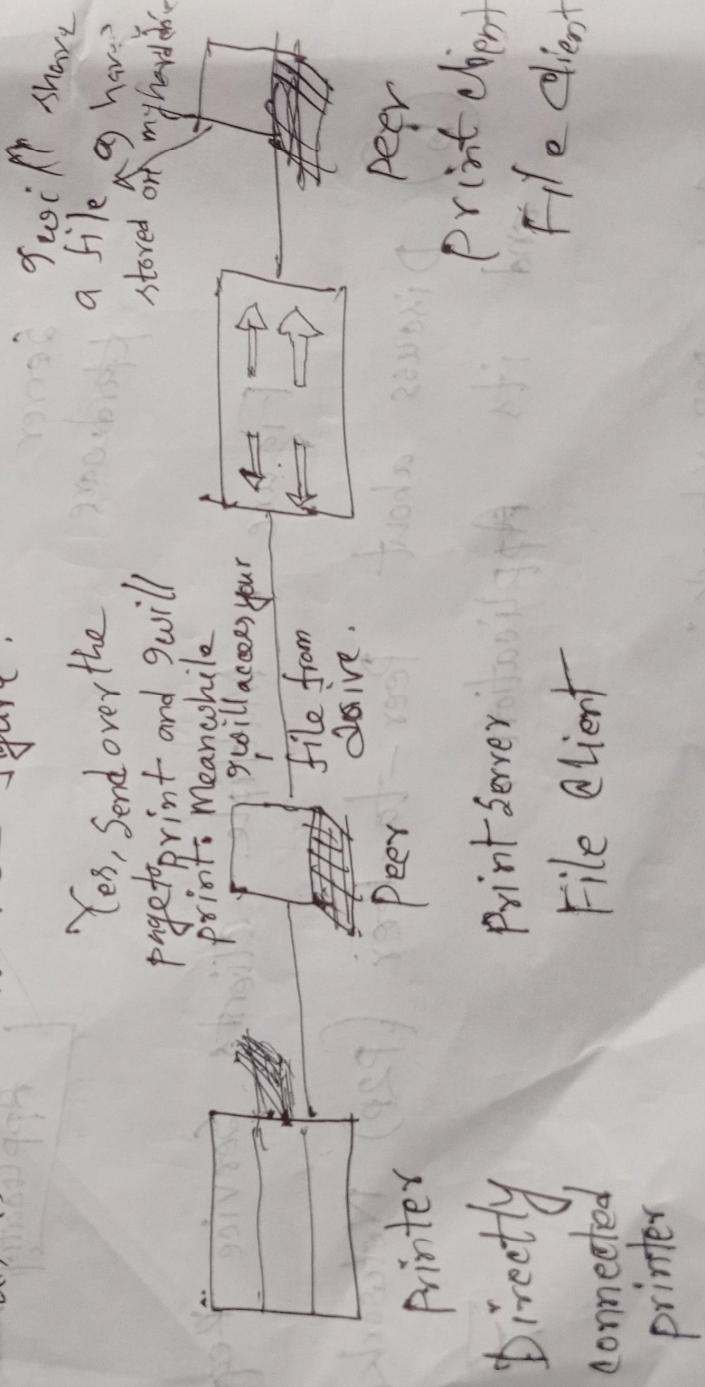
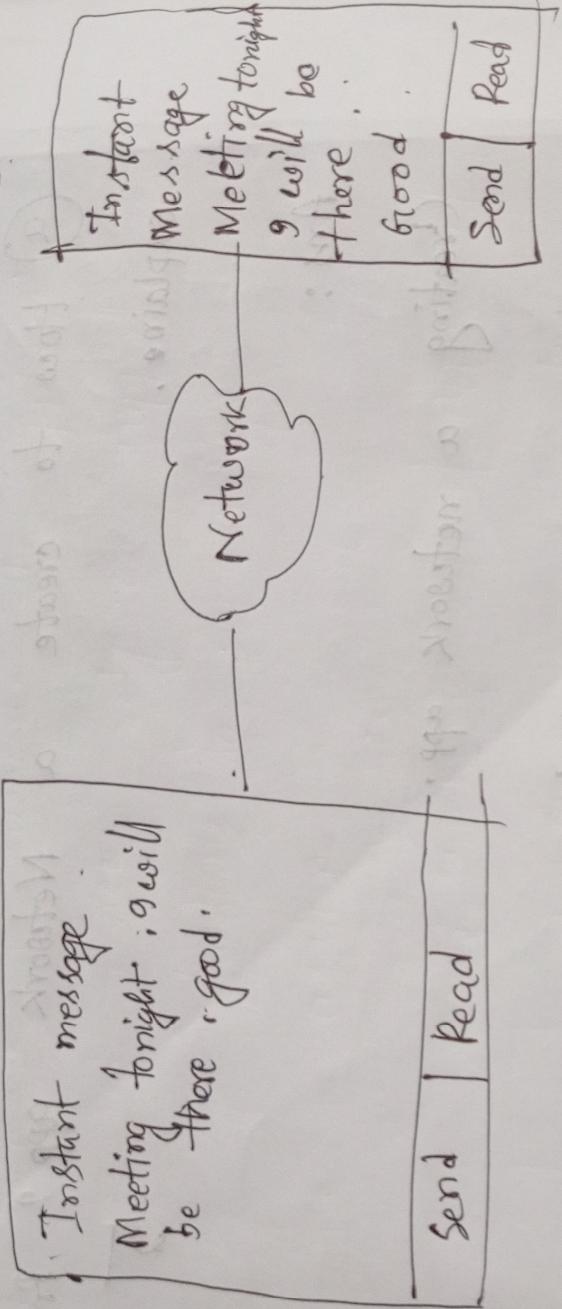


Figure 14 On a peer to peer networking

Peer-to-Peer Applications

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Client and Server : both supporting client and server.

- Both phones
- Initiate a call
- Receive a call

Both phones simultaneously
• Sent
• Receive

A type of peer-to-peer application is the P2P hybrid system, which utilizes a centralized directory called an index server even though the files being shared are on the individual host machine. Each peer accesses the index server to get the location of a resource stored on another peer.

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Q5.

a) How to create a Network app? Briefly explain.

Ans: Network applications
Input output
communication

Creating a network app.

Writing programs that:

1. run on (different) end systems,
2. communicate over network,
3. e.g. - web server, software communicates with browser software

No need to write software for network core devices.

1. Network core devices don't run user applications.

2. Applications on end systems allow

for rapid app development, propagation,

(17)

Q) Why is an application such as POP needed for electronic messaging? (Answer 4)

Ans:

Workstations interact with the SMTP host which receives the mail on behalf of every host in the organization, to retrieve messages, by using a client-server protocol such as Post office protocol, version 3 (POP3). Although POP3 is used to download messages from the server, the SMTP client still needed on the desktop to forward messages from the workstation user to its SMTP mail server.

C Define socket with a figure . . .

Ans:

Sockets:
* Process sends/receives messages to/from

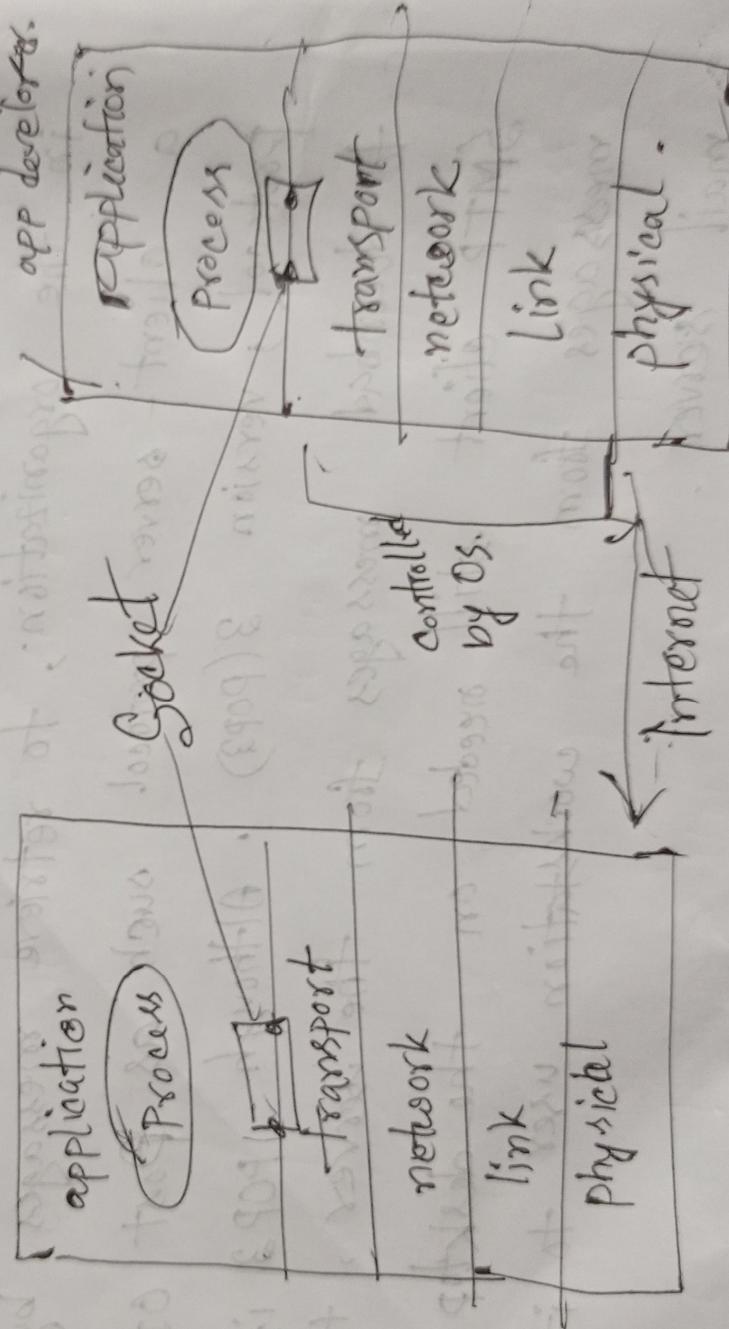
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its socket.

* Socket analogous to door.

1. Sending process pushes message out door.

2. Sending process relies on transport infrastructure
decisions other than side of door to deliver message to
socket at receiving process.



• Simplifies address conflict.

• Provides security.

Q6.

② Describe about FTP with a figure. 7

Ans:

FTP is another commonly used application layer protocol. FTP was developed to allow file transfer between a client and a server. An FTP client is an application that runs on a computer that is used to push and pull files from a server running the FTP daemon (FTPD).

To successfully transfer files, FTP requires two connections between client commands and server replies.

The client establishes the first connection to the server on TCP port 21. This connection is used for control traffic, consisting of client commands and

Q12

The client establishes the second connection to the server over TCP port 20. This connection is for the actual file transfer and is created every time a file is transferred.

The file transfer can happen in either direction, as shown in Figure 1. The client can download (pull) a file from the server or upload (push) a file to the server. (FTP) process

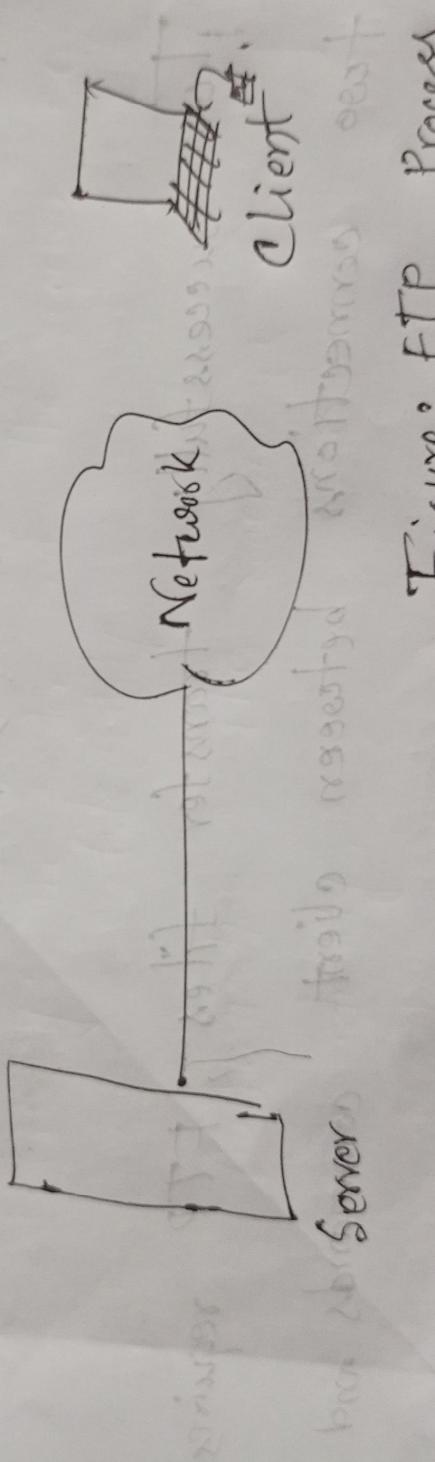


Figure: FTP Process.

Control Connection:
At a time, client opens first connection to the server for control traffic. When this connection is established, client opens second connection to the server for data traffic.

- Client opens second connection for control traffic
- ②
- Get Data... → from server
- Based on command sent across connection,
data can be downloaded from server or uploaded
from client.
- b) What is the purpose of HTML? Define GUI.
- Ans:
- HTML is a computer language for specifying
the contents and format of a web
document. It allows additional text
to include codes that define fonts,
layouts, embedded graphics and hyperlinks.

Q6) Is a standard for communication between
HTTP servers and executable programs. It is
used in creating dynamic documents.

Q) Please write down the name of four factors that
are need for a secure network ?

Ans:

1. Privacy: The sender and the receiver expect
confidentiality.
2. Authentication: The receiver is sure of the
senders identity.
3. Integrity: The data must arrive at the
receiver exactly as it was sent.
4. Non-Reputation: The receiver must also
be prove that a received message come
from a specific sender.

Q7.

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a) What is digital signature? Define Substitution and Transposition encryption.

Ans:

Digital Signature:

Digital signature is an electronic signature that can be used to authenticate the identity of the sender of a message or document and possibly to ensure that the original content of the message or document that has been sent is unchanged. Digital signature is easily transportable, cannot be imitated by someone else, and can be automatically time stamped. The ability to ensure without the original signed message arrived means that the sender

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can not easily repudiate it later.

Substitution: A character level encryption in which each character is replaced by another character in the set.

Transposition:

A character level encryption in which the characters retain their plaintext but the position of the character changes.

① Describe file-sharing services and SMB Protocol.

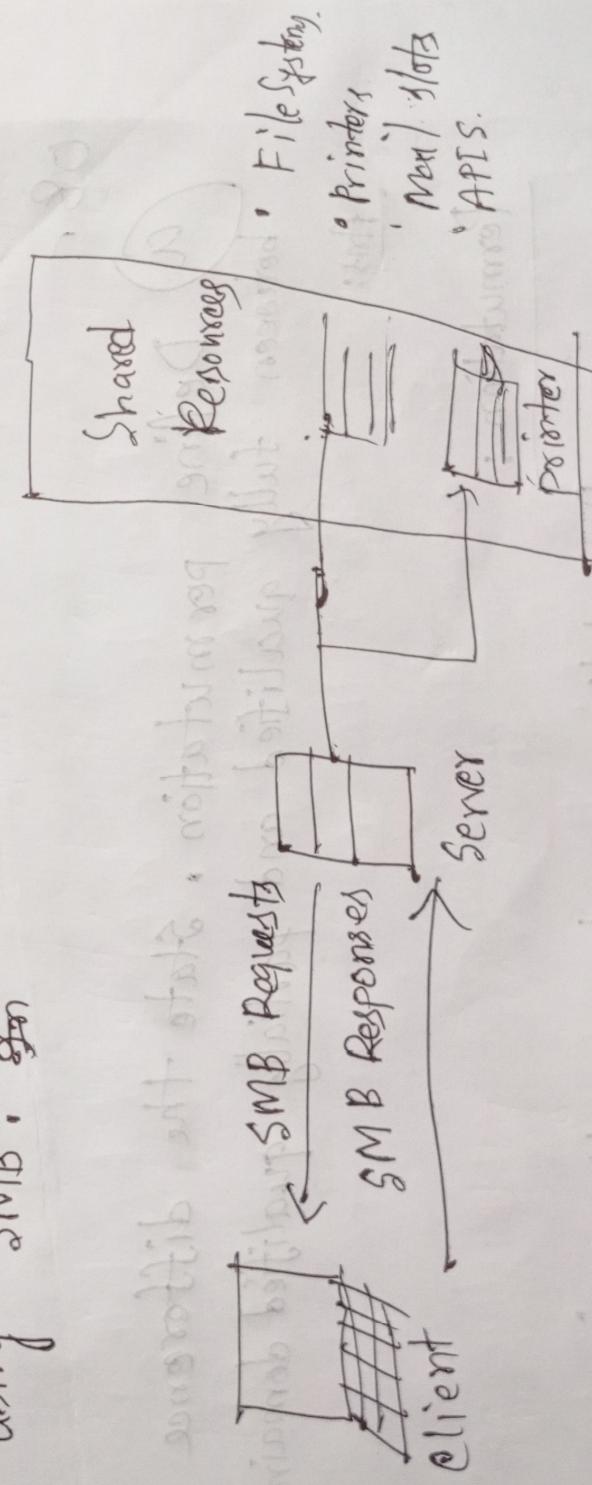
Ans: File sharing is a mechanism of sharing files between different hosts.

Server Message Block (SMB) is a client/server file sharing protocol. IBM developed SMB in the late 1980s to describe the structure of shared network resources, such as directories, files, printers, and servers. It is a request/response protocol. Unlike

②5

the file sharing supported by FTP, clients establish a long-term connection to servers. After the connection is established, the user of the client can access the resources on the server as if the resource is local to the client host.

SMB file-sharing and print services have become the mainstay of Microsoft networking. With the introduction of the Windows 2000 series of software, Microsoft changed the underlying structure for using SMB. In



The Linux and UNIX operating systems also provide a method of sharing resources with Microsoft networks using a version of SMB called SAMBA. The Apple Macintosh operating system also supports resource sharing using the SMB protocol.

SMB messages can perform the following tasks:

- Start, authenticate, and terminate sessions.
- Control file and printer access.
- Allow an application to send or receive messages to or from another device.

Q8.

(a) Define permutation. State the difference between fully qualified and partially qualified domain name.
Ans:

Permutation:

Permutation is transposition in bit level.

Straight permutation:

The no. of bits in the "input" and output
bits are preserved.

bitwise history

and domain names

Compressed permutation:

The no. of bits is reduced (some of
the bits are dropped).

Expanded permutation:

The no. of bits is increased (some
bits are repeated).

Difference between fully qualified and partially qualified
domain name:

Fully qualified

It gives the full location
of the specific domain
that bears it's name with
the whole DNS name space.

Partially qualified

Q8

Fully qualified	Partially qualified
Fully-qualified domain names are called absolute domain names.	Partially qualified domain names are sometimes called domain names.

⑥

How is a secret key different from public key?

Ans:

In secret key, the same key is used by both parties. The sender uses this key and an encryption algorithm to encrypt data; the receiver uses the same key and the corresponding decryption algorithm to decrypt the data. In public key, there

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are two keys: a private key and a public key. The private key is kept by the receiver. The public key is announced to the public.

Q) What are the advantages & disadvantages of public key encryption?

Ans:

Advantages:

- a. Remove the restriction of a shared secret key between two entities. Here each entity can create a pair of keys, keep the private one, and publicly distribute the other one.
- b. The no. of keys needed is reduced tremendously. For one million user to communicate, only two million keys are needed.

Disadvantages:

If you use large numbers the method has to be effective. Calculating the cipher text using the long keys takes a lot of time. So it is not recommended for large amounts of text.

Advantages:

Key building

• and reading
key, keep this balanced and strong copy
for deciphering itself. It is difficult to get hold of such a large key.
• easy to calculate
key length & to maintain off course
• fitting does not need a lot of time or space or long time
• and it is very simple to calculate