

### Ques No: 1:

- ① what is Data communication ? Define computer network. 4
- ② what are the Application of communication and computer network. 5
- ③ why we should learn Data communication and computer network? 5

### 2:

- a) what is PAN, LAN, MAN and WAN ? 4
- b) what is internetwork ? In todays world How they important is.? 6
- c) what are the use of Geographical network? 4

### 3.

- ① what is Ethernet ? Define fast-Ethernet and Giga-Ethernet . 4
- ② Define Virtual LAN . write a Diagram to describe work system of VLAN. 6
- ③ Define point to point network . Describe it briefly. 4

4:

- (a) what is OSI Model ? write the layer of OSI model. 4
- (b) Describe Bus topology and Ring Topology briefly. 6
- (c) what is Hybrid Topology ? write a diagram of it and describe briefly. 4

5:

- (a) what is internet Model ? Describe its layer briefly. 4
- (b) Define layered tasks . write a Diagram of layered tasks ? 6
- (c) what is star topology ? Describe star topology briefly. 4

6:

- (a) what is cryptography ? Define some cryptographic algorithm of present days. 4
- (b) Describe the categories of security threads. 5
- (c) Write a diagram of cryptography. 5

7.

- (a) what is application layer? Define peer-to-peer and client server. 4
- (b) How does socket program work? 5
- (c) Define remote procedure call. How does it work? 5

8.

- (a) Define Domain name system and file transfer protocol. 4
- (b) what are the directory services? Describe it. 5
- (c) what are the file services? Describe briefly. 5

### Ans to the ques No-1

(a)

#### Data communication:

Data communication refers to the transmission of this digital data between two or more computers and a computer network or a data network is a telecommunications network that allows computer to exchange data.

#### Computer network:

A system of interconnected and computerized peripherals such as printers is called computer network.

(b)

computer system and peripherals are connected to form a network. They provide numerous advantages;

- ④ Resource sharing such as storage devices.
- ④ Exchange of information by means of e-mails and FTP.
- ④ Information sharing by using Web or internet.
- ④ Interaction with other users using dynamic web page.
- ④ IP phones.
- ④ video conferences.
- ④ Parallel computing

(c)  
we should learn computer network and Data communication such as.

### Network Basic Understanding:

A system of inter connected computers and computerized peripherals such as printers is

called computer network. This interconnection among computer facilitates information sharing among them.

### Network Engineering:

Networking engineering is a complicated task, which involves software, firmware, chip level engineering and pulses. To ease network engineering the whole networking concept is divided into multiple layers. Each layer involve in some particular task and is independent of all other layer.

### Internet:

A network of networks is called an internetwork or simply the internet. It is the largest network in exist on this planet. The internet hugely connects all WANs and it can have connection to LANs and Home networks.

Internet uses TCP/IP protocol suite and uses IP as its addressing protocol. Present day, Internet is widely implemented using IPv4. Because of shortage of address space, it is gradually migrating from IPv4 to IPv6.

Forwarding

What is Billing of Information for Internet? It is used to calculate

Ans to the ques No-2

(a)

### Personal Area Network (PAN):

A personal Area Network (PAN), is smallest network which is very personal to a user. This may include Bluetooth enable devices or infra-red enable devices.

### Local Area Networks (LAN):

A computer network spanned inside a building and under single administrative system is generally termed as Local Area Network (LAN).

### Metropolitan Area Network (MAN):

The Metropolitan Area Network (MAN) generally extends throughout a city such as cable TV network. It can be in the form of Ethernet, Token-ring, ATM.

## Wide Area Network (WAN):

Wide Area Network (WAN) covers a wide area which may span across provinces, and even a whole country.

(b)

A network of networks is called an internetwork or simply the network. It is the largest network in existence on this planet. The internet largely connects all WAN's and it can have connection to LAN's and Home networks. Internet uses TCP / IP protocol suite and uses IP as its addressing protocol.

Internet enables its users to share and access enormous amount of information worldwide.

It uses WWW, FTP, email services, audio and video streaming etc.

Internet is widely deployed on world wide web services using HTML Linked pages and it accessible by client software.

Internet is serving many purposes and is involved in many aspects of life.

④ Web sites

④ E-mail.

④ Instant Messaging.

④ Blogging

④ Social Media

④ Marketing

④ Networking.

④ Audio and Video streaming.

Ques 10. Define Local Area Network (LAN).

Geographical area a Network can be using of the following categories:

- (a) It may be spanned across table, among Bluetooth enabled devices. Ranging not more than few meters.
- (b) It may be spanned across a whole building including intermediate devices to connect all floors.
- (c) It may be spanned across a whole city
- (d) It may across multiple cities or provinces.
- (e) It may one network covering whole world.

### Ans to the ques No-3

(a)

#### Ethernet:

Ethernet is way of connecting computers together in a local area network or LAN. It has been the most widely used method of linking computers together in LAN.

#### fast-Ethernet:

To encompass need of fast emerging software and hardware technologies, Ethernet extends itself as Fast-Ethernet. It can run on UTP, Optical fiber and wirelessly too.

#### Giga-Ethernet:

First-Ethernet could enjoy its high speed status only for 3 years till Giga-Ethernet introduced. Giga-Ethernet provides speed up to 1000 mbits/seconds.

(b)

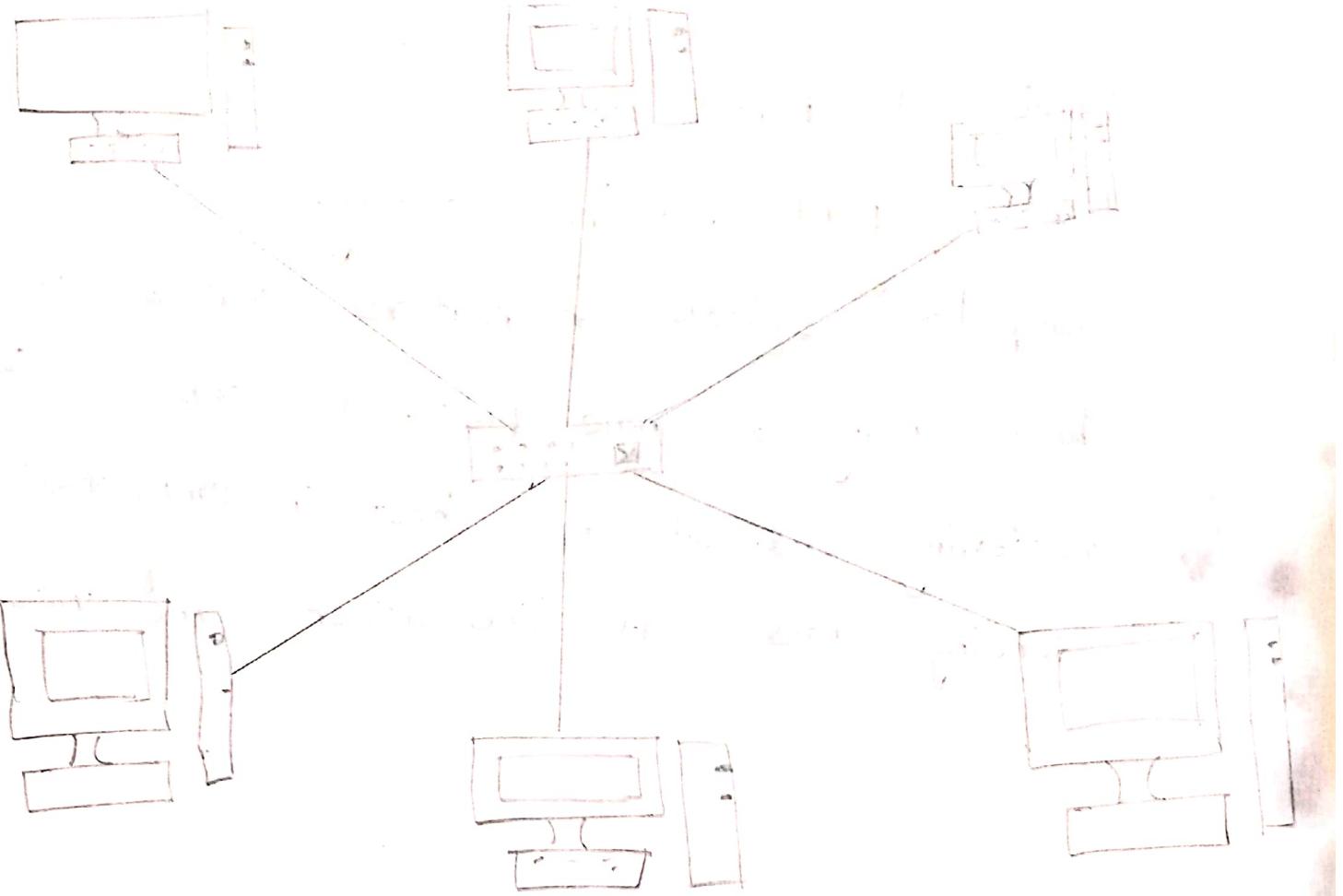
### Virtual LAN:

LAN uses Ethernet which in turn works on shared media. Shared media in Ethernet create one single Broadcast domain and one single Collision domain. Introduction of switch to Ethernet has removed single collision domain. But even switch cannot divide a network into separate Broadcast domains.

Virtual LAN is a solution to divide a single Broadcast domain into multiple Broadcast domains.

Host in one VLAN cannot speak to a host in another. By default all hosts are placed into the same VLAN.

Diagram:

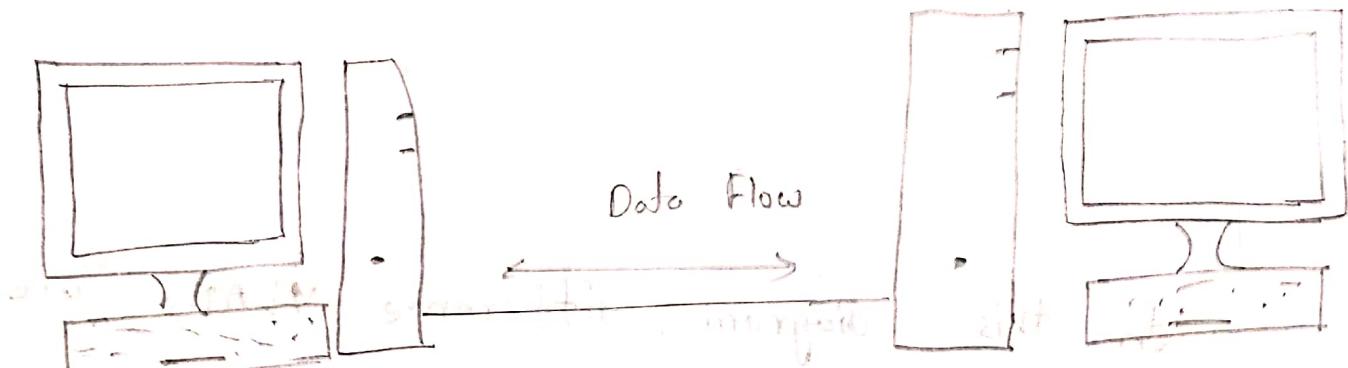


In this diagram, difference VLANs are depicted in different colors. Hosts in one VLAN, even if connected on the same switch cannot see or speak to other hosts in different VLANs.

(c)

### Point - to Point;

Point-to-point network exactly two hosts such as computer, switch or routers, serves connected back using a single piece of cable. Often the receiving end of one host is connected to sending end of the other and vice-versa.



if the two hosts are connected point-to-point logically, then may have multiple intermediate device. But the end hosts are unaware of underlying and each other as if they are connected directly.

## Ans to the ques No-4

(a)

### OSI model:

Open System Interconnect is an open standard for all communication system. OSI model is established by International Standard Organization (ISO). The model of 7 layer:

Application layer

Presentation layer

Session layer

Transport layer

Network layer

Data Link Layer

Physical Layer.

(b)

### Bus Topology:

In case of Bus Topology, all devices share single communication line or cable. Bus topology may have problem while multiple host sending data at the same time. Therefore, Bus topology either uses CSMA/CD technology or recognizes one host as Bus Master to solve the issue. It is one of the simple form of networking where a failure of a device does not affect the other devices. But failure of shared communication line can make all other devices stop functioning.

### Ring Topology:

In ring topology, each host machine connects to

exactly two other machine. creating a circular network structure . When one host tries to communicate or send sms to host which is not adjacent to it . the data travels through all intermediate host . To connect one more host in the existing structure the administrator may need only one more extra cable.

(c)

### Hybrid Topology:

A network structure whose design contains more than one topology is said to be hybrid topology . Hybrid topology ~~inherits~~ merits and demerits of all interconnect topology .

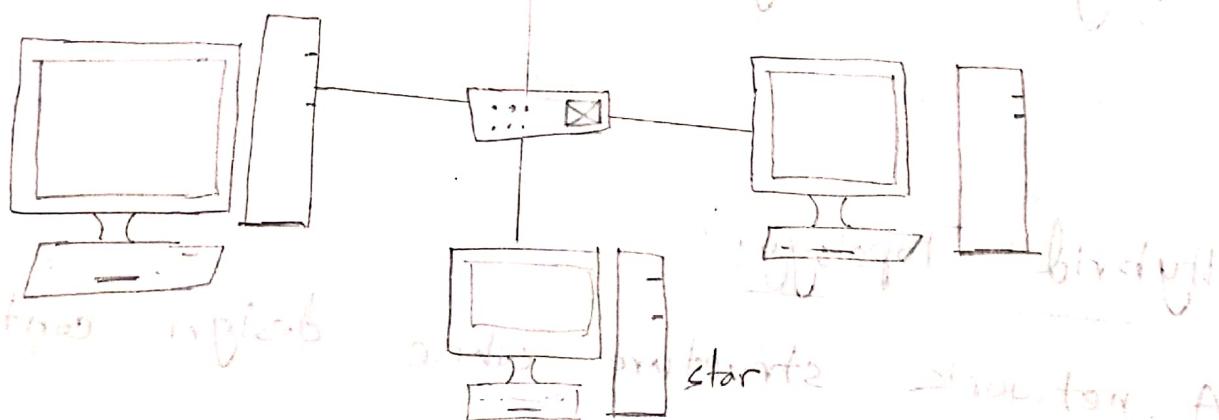
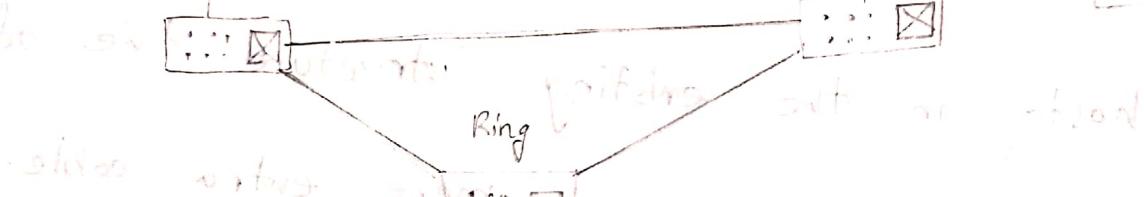
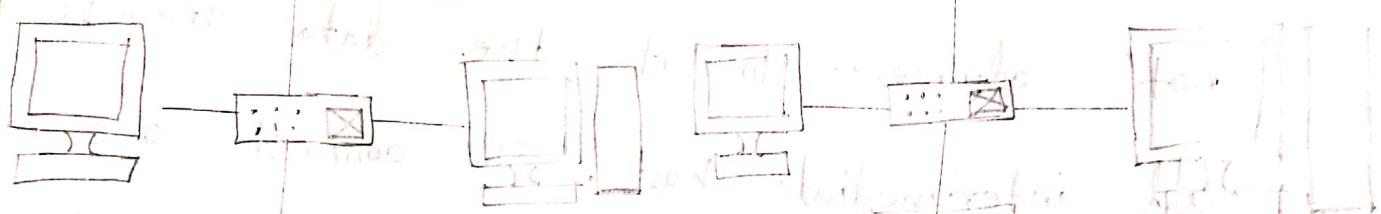
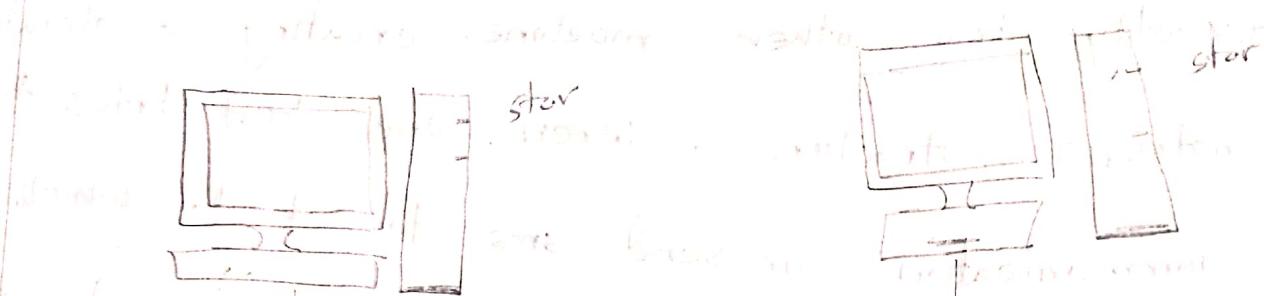


Diagram: Hybrid Topology.

BB

BB

## Ans to the ques No-5

Internet uses TCP / IP protocol suite, also known as internet suite. This define Internet Model which contains four layered architecture. OSI Model is general communication model but Internet model is what the internet uses for all its communication. This model has following layer.

1. Application layer

2. Transport layer

3. Internet layer

4. Link layer

① Application layer: This layer defines the protocol which enables user to interact with the network.

② Transport layer: This layer defines how data should flow between hosts. Major protocol at this

is Transmission control Protocol (TCP).

③ Internet layer: Internet protocol (IP) works on this layer. This layer facilities host addressing and recognition.

④ Link layer: This layer provides mechanism of sending and receiving actual data.

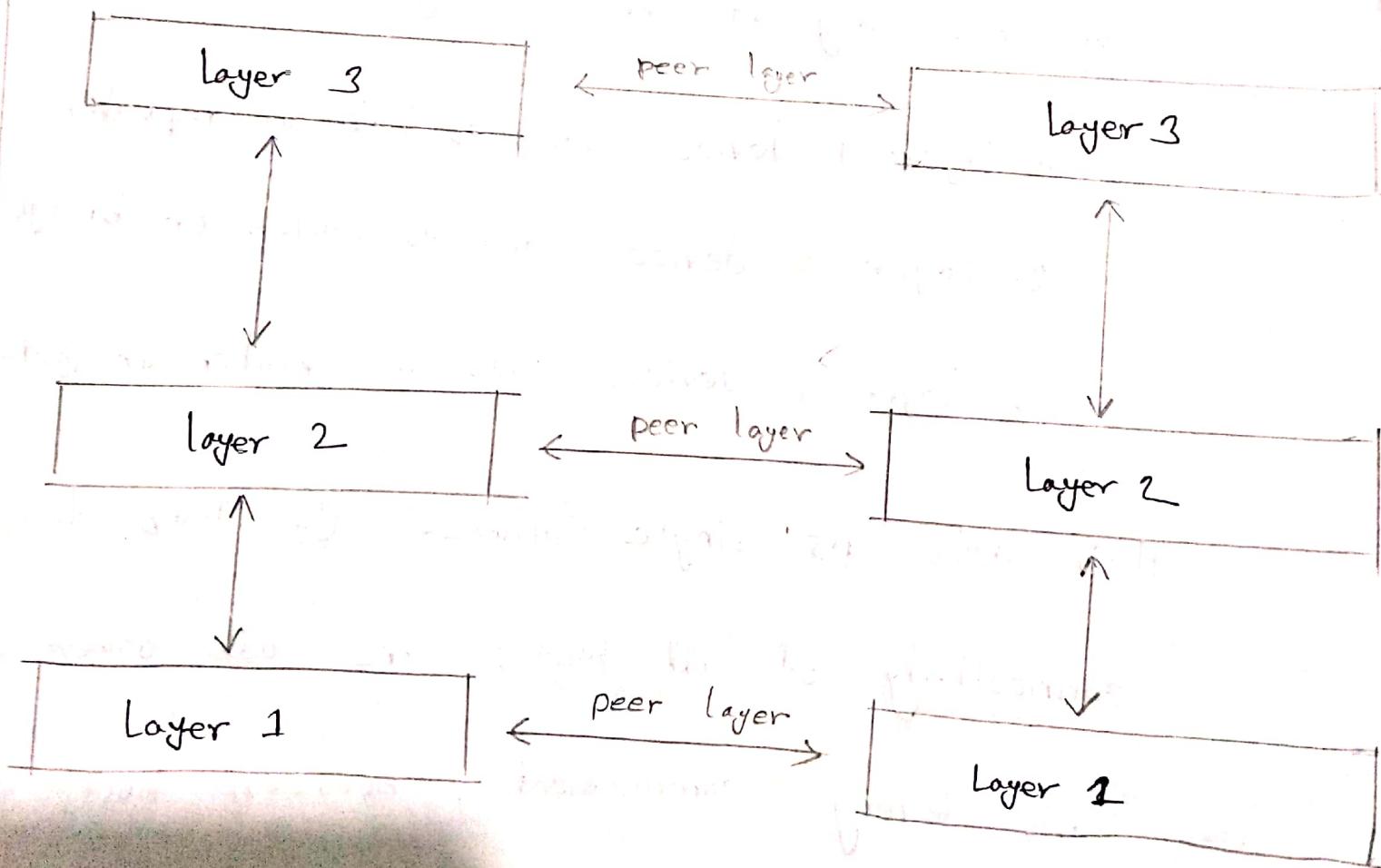
(b)

### Layered Tasks:

In layered architecture of network Model, one whole network process into small task. Each email task is then assigned to a particular layer which works dedicatedly to process the task only. Every layer does only specific work.

In layer communication system, one layer of a host deals with the task done by or to be done

by its peer layer at the same level on the remote host. The task is either initiated by layer at the lowest level or at the top most level. If the task is initiated by the top most layer, it is passed on to the layer below it for further processing.



(c)

### Star topology:

All host in star topology are connected to a central device, known as hub device, using point-to-point connection. That is, there exists a point-to-point connection between hosts and hub. The hub device can be any of the following:

1. layer-1 device such as hub or repeater
2. layer-2 device such as switch or bridge
3. layer-3 device such as router or gateway.

Hub acts as single failure. If hub fails, connectivity of all hosts are all other hosts fails. Every communication between hosts takes place through only the hub.

## Ans to the ques No-6

(a)

### Cryptography!

Cryptography is a technique to encrypt the plain text data which makes it difficult to understand and interpret.

There are several cryptographic algorithms available present day as described below:

- ④ Secret key
- ② Public key
- ③ Message Digest

#### ① Secret key:

Both sender and receiver have one secret key -

This secret key is used to encrypt the data at sender's end. After the data is encrypted, it is

sent on the public domain to the receiver. Because the receiver knows.

### Public key:

In this encryption system every user has its own secret key and it is not in the shared domain.

The secret key is never revealed on public domain.

### Message Digest:

In this method actual data is not sent, instead a hash value is calculated and sent. The other end user, computes its own hash value.

(b)

Security threats can be divided into the following categories:

#### ① Interruption:

Interruption is a security threat in which availability of resources is attacked.

## ② Privacy - Breach:

In this threat, the privacy of user is compromised. Someone who is not the authorized person is accessing or intercepting data sent or received by original user.

## ③ Integrity:

This type of threat includes any alteration or modification in the original context of communication. The attacker intercepts and receives the data sent by the sender.

## ④ Authenticity:

This threat occurs when an attacker or a security violator, poses as a genuine person.

(c)

Diagram of cryptography :

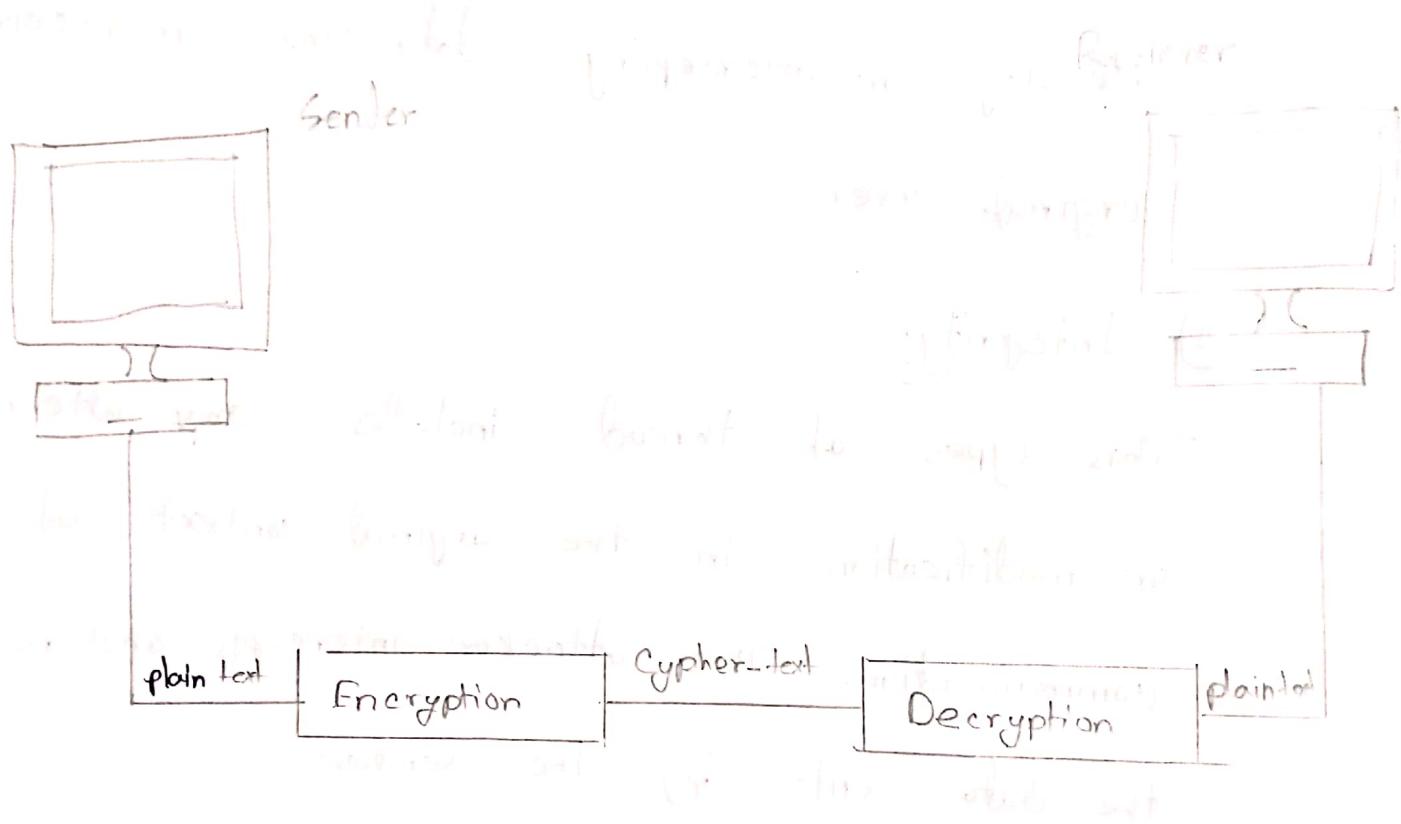


fig: Cryptography .

Student A

Scanned with CamScanner

## Ans to the ques No-7

(a)

### Application layer:

Application layer is the top most layer in OSI and TCP/IP layered model. This layer exists in both layered models because of its significance of interacting with user and user applications.

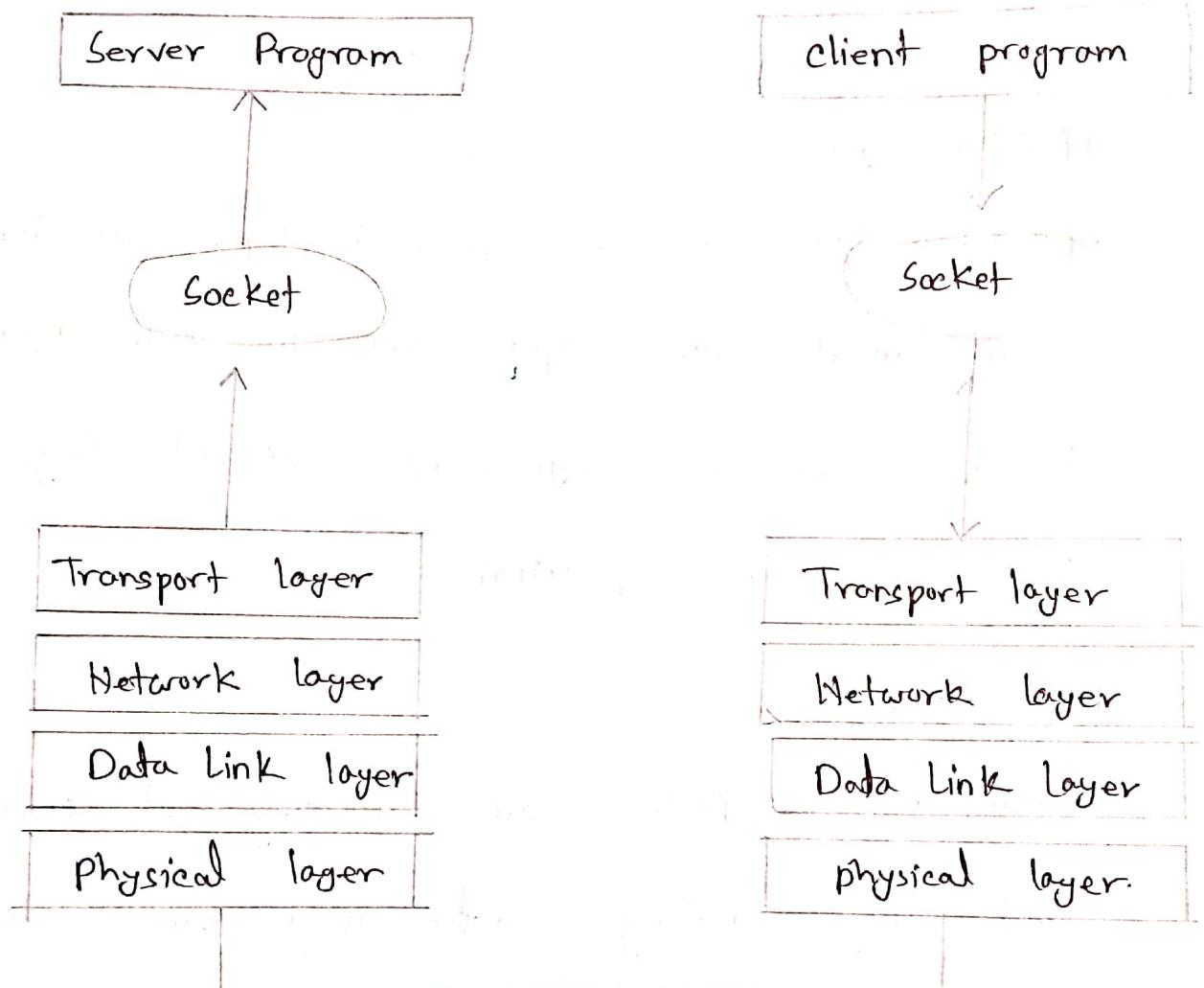
### Peer - to - Peer:

Both remote process are executing at same level and they exchange data using some shared resource.

### client - Server:

One remote process acts as a client and requests some resource from another application process.

(b)



In this paradigm, the process acting as server open a socket using a well-known port and waits until some client request comes. The second process acting as a client also opens

a socket but instead of waiting for an incoming request the client process request first.

When the request is reached to server, it is served :

(c)

### Remote Procedure call:

This is a mechanism where one process interacts with another by means of procedure calls.

One process calls the procedure lying on remote host. The communication happens in the following way.

- ④ The client process calls the client stub.  
It passes all the parameters pertaining to program local to it.

④ All parameters are then packed and a system call is made to send them to other side.

⑤ Kernel sends the data over the network

⑥ The remote host passes data to server stub

⑦ The result is sent back to the client

in the same manner.

⑧ The parameter are passed to the

procedure and the procedure is then executed

with an interrupt and message and the result

is returned.

Advantages of RPC are as follows:

1. Encapsulation of data and the message to be transferred.

2. Application independence.

Ans to the ques No-8

(a)

### Domain Name System:

The Domain Name system (DNS) works on client server model. It uses UDP protocol for transport layer communication. DNS uses hierarchical domain base naming scheme.

### file transfer Protocol:

The file transfer Protocol is the most widely used protocol for file transfer over the network.

FTP uses TCP/IP for communication and it work TCP port 21.

(b)

### Directory Services;

These services are mapping between name and its value which can be variable, value or fixed. This software system helps to store the information, organization and provides various means of accessing it.

### ④ Accounting:

In an organization a number of users have their user name and passwords mapped to them.

### ⑤ Authentication and Authorization;

User credentials are checked to authenticate a user at the time of login and periodically.

## B) Domain Name Services:

DNS is widely used and one of the essential services on which internet works. This system maps IP addresses to domain names, which are easier to remember and recall than IP address.

(c)

file service include sharing and transferring file over the network.

## B) file sharing:

One of the reason which gave birth to networking was file sharing. File sharing enables its users to share their data with

other users. User can upload to a specific server, which is accessible by all intended users. As an alternative user can make its file shared on its own computer and provides access to intended users.

### File transfer:

This is an activity to copy or move file from one computer to another computer or to multiple computer, with help of underlying network. Network enables its user to locate other user in the network and transfer file.