

At a Glance Material XII – IP – Networks (10 Marks)

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Topic 1

Introduction to Networks

Types of Network : PAN, LAN, MAN, WAN

Network: A group of two or more similar things or people interconnected with each other is called network.

Ex: • Social network

- Mobile network
- Network of computers
- Airlines, railway, banks, hospitals networks.

Computer Network: A computer network is an interconnection among two or more computers or computing devices.



Such interconnection allows computers to share data and resources among each other.

A computer network can include different types of hosts (also called nodes) like server, desktop, laptop, cellular phones.

Apart from computers, networks include **networking devices** like switch, router, modem, etc. Networking devices are used to connect multiple computers in different settings.

Smaller chunks of data is called as **packets**.

Node: In a communication network, each device that is a part of a network and that can receive, create, store or send data to different network routes is called a node.

A node can be a device such as a **modem, hub, bridge, switch, router, digital telephone handset, a printer, a computer or a server**.

Uses of Networks:

- ☐ Interconnectivity of computing devices in a network
- ☐ allows us to exchange information simultaneously with many parties through email, websites, audio/video calls, etc.
- ☐ Network allows sharing of resources. For example, a printer can be made available to multiple computers through a network;
- ☐ A networked storage can be accessed by multiple computers.
- ☐ People often connect their devices through hotspot, thus forming a small personal network.

Types of Networks

There are various types of computer networks ranging from network of handheld devices (like mobile phones or tablets) connected through Wi-Fi or Bluetooth within a single room to the millions of computers spread across the globe. Some are connected wireless while others are connected through wires.

Based on the **geographical area** covered and data transfer rate, computer networks are **broadly categorised as:**

- LAN (Local Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)
- PAN (Personal Area Network)

Local Area Network (LAN):

It is a network that connects computers, mobile phones, tablet, mouse, printer, etc., placed **at a limited distance**.

The geographical area covered by a LAN can **range from a single room, a floor, an office having one or more buildings in the same premise, laboratory, a school, college, or university campus**.

The connectivity is done by means of wires, Ethernet cables, fibre optics, or Wi-Fi.

A Local Area Network (LAN) is shown as

LAN is comparatively secure as only authentic users in the network can access other computers or shared resources. Users can print documents using a connected printer, upload or download documents and software to and from the local server. Such LANs provide the short range communication with the high speed data transfer rates. **These types of networks can be extended up to 1 km.**



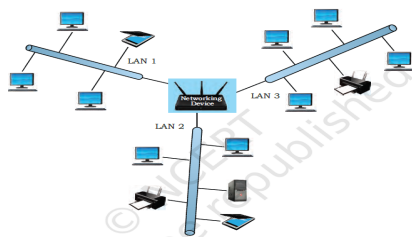
Data transfer in LAN is quite high, and usually varies from 10 Mbps (called Ethernet) to 1000 Mbps (called Gigabit Ethernet), where Mbps stands for Megabits per second.

Ethernet is a set of rules that decides how computers and other devices connect with each other through cables in a local area network or LAN.

Metropolitan Area Network (MAN)

Metropolitan Area Network (MAN) is an extended form of LAN which **covers a larger geographical area like a city or a town**. Data transfer rate in MAN also ranges in Mbps, but it is considerably less as compared to LAN.

Cable TV network or cable based broadband internet services are examples of MAN. This kind of network can be extended up to 30–40 km. Sometimes, many LANs are connected together to form MAN, as shown here



Metropolitan Area Network

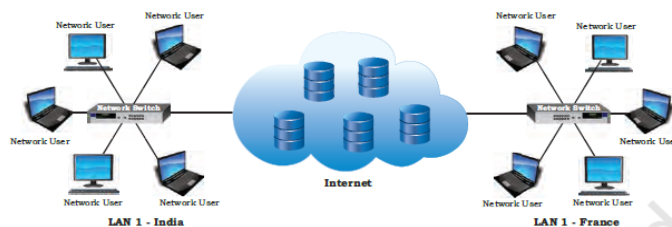
Wide Area Network (WAN):

Wide Area Network (WAN) connects computers and others LANs and MANs, which are spread across different geographical locations of a country or in different countries or continents.

A WAN could be formed by connecting a LAN to other LANs (as in Figure) via wired or wireless media.

Large business, educational and government organisations connect their different branches in different locations across the world through WAN.

The Internet is the largest WAN that connects billions of computers, smartphones and millions of LANs from different continents.



Wide Area Network

Personal Area Network (PAN) :

A Personal Area Network is designed for personal use within a range of a few meters, typically not exceeding **10 meters**.

The primary purpose of a PAN is to facilitate the connection of personal devices for the individual's use, allowing data sharing, communication, and connectivity between devices like smartphones, tablets, laptops, and wearable devices within a close proximity.

Devices/technology connected to PAN:

Bluetooth Connectivity, Smart Watches and Fitness Trackers, Smart Phones, etc.

CBSE QUESTIONS - MCQs

1. Which type of network covers a small geographical area like a single office, building, or school campus?

(A) PAN (B) MAN (C) LAN (D) WAN

2. Television cable network is an example of:

- i. LAN
- ii. WAN
- iii. MAN
- iv. Internet

3. What is the type of network for long distance communication ?

- (A) LAN (B) MAN
(C) WAN (D) PAN

CBSE - QUESTIONS & ANSWERS

1. Mention any four networking goals.

A) Four networking goals are:

- i. Resource sharing ii. Reliability
iii. Cost effective iv. Fast data sharing

Topic 2

Network Devices : Modem, Hub, Switch,
Repeater, Router, Gateway

NETWORK DEVICES

To communicate data through different transmission media and to configure networks with different functionality, we require different devices like **Modem, Hub, Switch, Repeater, Router, Gateway, etc.**

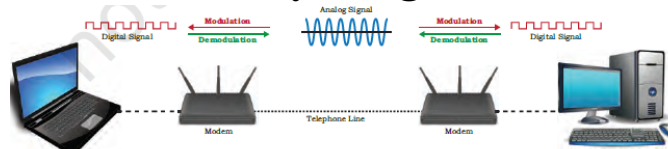
Modem :

Modem stands for ‘**MODulator DEMolulator**’. It refers to a device used for **conversion between analog signals and digital bits.**

We know computers store and process data in terms of 0s and 1s. However, to transmit data from a sender to a receiver, or while browsing the internet, digital data are converted to an analog signal and the medium (be it free-space or a physical media) carries the signal to the receiver.

There are modems connected to both the source and destination nodes. The modem at the **sender’s end** acts as a **modulator that converts the digital data into analog signals**. The modem at the **receiver’s end** acts as a **demodulator that converts the analog signals into digital data** for the destination node to understand.

Following Figure shows connectivity using a modem:



Use of Modem

Ethernet Card:

Ethernet card, also known as Network Interface Card (NIC card in short, **Terminal Access Point - TAP**) is a network adaptor used to set up a wired network.



It acts as an **interface between computer and the network**. It is a circuit board mounted on the motherboard of a computer.

The Ethernet cable connects the computer to the network through NIC. Ethernet cards can support data transfer between 10 Mbps and 1 Gbps (1000 Mbps).

Each NIC has a **MAC address**, which helps in uniquely identifying the computer on the network.

Repeater :

Data are carried in the form of signals over the cable. These signals can travel a specified distance (usually about **100 m**).

Signals lose their strength beyond this limit and become weak. In such conditions, original signals need to be regenerated.

A repeater is an analog device that works with signals on the cables to which it is connected. **The weakened signal appearing on the cable is regenerated and put back on the cable by a repeater.**



Hub:

An Ethernet hub is a network device used **to connect different devices through wires**.

Data arriving on any of the lines are sent out on all the others (broadcast).

The limitation of hub is that if data from two devices come at the same time, they will collide.



Switch:

A switch is a networking device that plays a central role in a Local Area Network (LAN).

Like a hub, network switch is used to connect multiple computers or communicating devices. When data arrives, the switch extracts the destination address from the data packet and looks it up in a table to see where to send the packet.

Thus it sends signals to only selected devices instead of sending to all. It can forward multiple packets at the same time.

A switch does not forward the signals which are noisy or corrupted. It drops such signals and asks the sender to resend it.

Ethernet switches are common in homes and offices to connect multiple devices, thus creating LANs or to access the Internet.



Router :

A router is a network device that can receive the data, analyse it and transmit it to other networks.

A router connects a local area network to the internet.

Compared to a hub or a switch, a router has advanced capabilities as it can analyse the data being carried over a network, decide or alter how it is packaged, and send it to another network of a different type.

For example, data has been divided into packets of a certain size. Suppose, these packets are to be carried over a different type of network which cannot handle bigger packets, in such a case, the data is to be repackaged as smaller packets and then sent over the network by a router.

A router can be wired or wireless. A wireless router can provide Wi-Fi access to smartphones and other devices. Usually, such routers also contain some ports to provide wired Internet access.

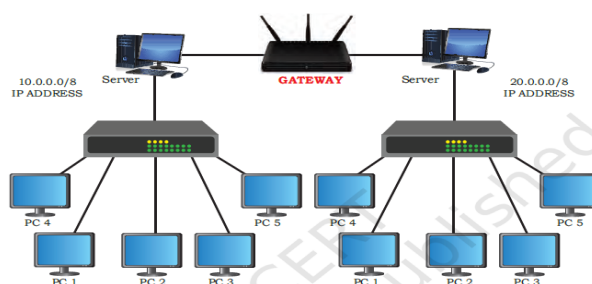
These days, home Wi-Fi routers perform the dual task of a router and a modem or switch. These routers connect to incoming broadband lines, from **ISP** (Internet Service Provider), and convert them to digital data for computing devices to process.

Gateway:

As the term “Gateway” suggests, **it is a key access point that acts as a “gate” between an organisation's network and the outside world of the Internet.**

Gateway serves as the entry and exit point of a network, as all data coming in or going out of a network must first pass through the gateway in order to use routing paths.

Besides routing data packets, gateways also maintain information about the host network's internal connection paths and the identified paths of other remote networks. If a node from one network wants to communicate with a node of a foreign network, it will pass the data packet to the gateway, which then routes it to the destination using the best possible route.



Network gateway

For simple Internet connectivity at homes, the gateway is usually the Internet Service Provider that provides access to the entire Internet.

Generally, a router is configured to work as a gateway device in computer networks.

A gateway can be implemented as software, hardware, or a combination of both. This is because a network gateway is placed at the edge of a network and the firewall is usually integrated with it.

Firewall: To prevent unauthorized access to and / or from the network, a system known as Firewall. It can be implemented by hardware and/or software.

CBSE QUESTIONS - MCQs

1. What does a modem do at the sender's end ?

- (A) It converts analog signals into digital data.
- (B) It converts digital data into analog signals.**
- (C) It converts digital data into optical signals.
- (D) It converts optical signals into digital data.

2. For the following Question, two statements are given - one labelled as Assertion(A) and the other labelled as Reason (R). Select the correct answer to these questions from the code(a),(b), (c) and (d) as given below:

- (a) Both Assertion (A) and Reason(R) are true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason(R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.**

Assertion (A): Modem stands for 'Modulator Demodulator'

Reason (R): The modem at the sender's end acts as a demodulator that converts the digital data into analogue signals and at the receiver's end acts as a modulator that converts analogue signals into digital data.

A) (c) Assertion(A) is true but Reason(R) is false.

3. **Assertion (A):-** MODEM stands for modulator-demodulator.

Reasoning (R): - It is a computer hardware device that converts data from a digital format to analog and vice versa.

- i. Both A and R are true and R is the correct explanation for A**
- ii. Both A and R are true and R is not the correct explanation for A
- iii. A is True but R is False
- iv. A is false but R is True

4. **Switch** network device is known as an intelligent hub .

5. Identify the networking device responsible for routing data packets based on their destination addresses.

- (A) Modem
- (B) Hub
- (C) Repeater
- (D) Router**

6. _____ is a networking device which can analyse the data being carried over a network, decide or alter how it is packaged, and send it to another network of a different type

- a. Modem
- b. Hub

c. Router

d. Switch

7. A is a network device that can receive the data, analyse it and transmit it to other networks.

(a) Modem

(b) Switch

(c) Repeater

(d) Router

8. A _____ is a device that connects the organisation's network with the outside world of the Internet.

i. Hub

ii. Modem

iii. Gateway

iv. Repeater

9. To prevent unauthorized access to and / or from the network, a system known as **Firewall**, can be implemented by hardware and / or software.

CBSE - QUESTIONS & ANSWERS

1. (a) Write one function each for the following network devices :

(i) MODEM

(ii) Router

Ans) (i) Modem converts digital signals into analog signals and vice-versa.

(ii) Router receives data, analyzes it and transmits it to the destination through the best possible route.

2. What is the primary function of a gateway in a computer network ? Explain briefly.

A) Gateway is used to connect two networks or applications that use different protocols.

3. What is the function of a Gateway?

A. A gateway is a network device that establishes an intelligent connection between a local network and external networks with completely different structures

OR

It is a network device that connects two dissimilar networks.

4. Give examples of any two network devices.

A) Modem, Repeater, Router, NIC Card, Hub, Switch

Topic 3

Network Topologies : Star, Bus, Tree, Mesh

NETWORK TOPOLOGIES

(Star, Bus, Tree, Mesh)

Networking Topologies: The arrangement of computers and other peripherals in a network is called its topology.



Star Topology:

In star topology, each communicating device is connected to a central node, which is a networking device like a hub or a switch.

Star topology is considered very effective, efficient and fast as each device is directly connected with the central device.

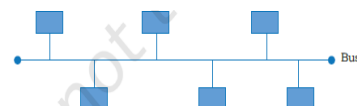
Although disturbance in one device will not affect the rest of the network, any failure in the central networking device may lead to the failure of complete network.

The central node can be either a broadcasting device means data will be transmitted to all the nodes in the network, or a unicast device means the node can identify the destination and forward data to that node only.

Bus Topology:

In bus topology, each communicating device connects to a transmission medium, known as bus.

Data sent from a node are passed on to the bus and hence are transmitted to the length of the bus in both directions. That means data can be received by any of the nodes connected to the bus.



In this topology, a single backbone wire called bus is shared among the nodes, which makes it cheaper and easy to maintain. Both ring and bus topologies are considered to be less secure and less reliable.

Tree or Hybrid Topology:

It is a hierarchical topology, in which there are multiple branches and each branch can have one or more basic topologies like star, ring and bus. Such topologies are usually realised in WANs where multiple LANs are connected.



Those LANs may be in the form of ring, bus or star. In the above figure, a hybrid topology is shown connecting 4 star topologies in bus.

In this type of network, data transmitted from source first reaches the centralised device and from there the data passes through every branch where each branch can have link for more nodes.

Mesh Topology :

In this networking topology, each communicating device is connected with every other device in the network.

Such a network can handle large amounts of traffic since multiple nodes can transmit data simultaneously.



Also, such networks are more reliable in the sense that even if a node gets down, it does not cause any break in the transmission of data between other nodes.

This topology is also more secure as compared to other topologies because each cable between two nodes carries different data.

However, wiring is complex and cabling cost is high in creating such networks, and there are many redundant or unutilised connections.

CBSE QUESTIONS - MCQs

1. In which of the network topologies do all devices connect to a central point, such as a switch or hub?
(A) **Star** (B) Bus
(C) Tree (D) Mesh
2. Which of the following topologies is very efficient and all nodes are connected to a central hub?
(i) **Star** (ii) Tree
(iii) Bus (iv) Ring
3. Which of the following topologies needs least cable length ?
(A) Star (B) Tree
(C) **Bus** (D) None of the above
4. Which network topology typically results in less wire length usage as compared to others?
a. Star topology b. Mesh topology
c. **Bus topology** d. Hybrid topology
5. In topology, the devices are arranged in the form of multiple branches in hierarchical manner.
(i) Star (ii) **Tree**
(iii) Mesh (iv) Bus

CBSE - QUESTIONS & ANSWERS

(1) Write any one advantage and any one disadvantage of BUS topology

A) Advantage:

It is relatively inexpensive to implement.

It is easy to expand. New devices can be added to the network by connecting them to the central cable.

It is easy to troubleshoot.

Disadvantage:

If the central cable fails, the entire network will be down. Since the whole transmission occurs through a central cable, there is a possibility of data collision in the network.

The number of devices that can be connected to a bus topology is limited.

It is difficult to isolate a problem.

(2) Write any one advantage and one disadvantage of Star topology.

Advantage of Star Topology:

Centralized control and management makes it easy to monitor, troubleshoot, and scale the network.

Other points to be accepted:

- reliable – if one cable or device fails then all the others still work
- high-performing as no data collisions can occur
- Easier to install
- Easy fault detection
- No disruption to the network when connecting or removing devices

Disadvantage of Star Topology :

Dependence on the central device (hub or switch). If the central device fails, the entire network becomes inaccessible.

Other points to be accepted:

- More Cable required
- More expensive

(3) Write any one main advantage and one main disadvantage of Star Topology.

A) One main advantage of Star Topology:

Centralized control and management makes it easy to monitor, troubleshoot, and scale the network.

Other points to be accepted:

- reliable – if one cable or device fails then all the others will still work.
- high-performing as no data collisions can occur.
- Easier to install.
- Easy fault detection.
- No disruptions to the network when connecting or removing devices.

One main disadvantage of Star Topology :

Dependence on the central hub or switch. If the central hub fails, the entire network becomes inaccessible.

Other points to be accepted:

- More Cable required
- More expensive.

(4) Give one advantage and disadvantage each of Bus and Star topology.

A) Advantage of BUS Topology :

Minimum cable length required

Disadvantage of BUS Topology :

If there is any problem in the main cable the entire network fails.

Advantage of STAR Topology :

Considered faster than other topologies, as each device is directly connected with the central hub/device.

Disadvantage of STAR Topology :

More cable length is required compared to Bus topology.

(5) Which of the following is not a network topology: Star, Mesh , Tree, Bug , Bus

A) Bug

Topic 4

Introduction to Internet, URL, WWW, and its applications – Web, email, Chat, VoIP.

The Internet is the global network of computing devices including desktop, laptop, servers, tablets, mobile phones, other handheld devices as well as peripheral devices such as printers, scanners, etc.

In addition, it also **consists of** networking devices such as routers, switches, gateways, etc.

Today, smart electronic appliances like TV, AC, refrigerator, fan, light, etc., can also communicate through the Internet. The list of such smart devices are always increasing e.g., drones, vehicles, door lock, security camera, etc.

The Internet is evolving everyday. Computers are either connected to a modem through a cable or wirelessly (Wi-Fi). A modem, be it wired or wireless, is connected to a local Internet Service Provider (ISP) who then connects to a national network. Many such ISPs connect together forming a regional network and regional networks connect together forming a national network, and such country-wise networks form the Internet backbone.

The Internet today is a widespread network, and its influence is no longer limited to the technical fields of computer communications. It is being used by everyone in the society as is evident from the increasing use of online tools for education, creativity, entertainment, socialisation and e-commerce.

APPLICATIONS OF INTERNET

Following are some of the broad areas or services provided through Internet:

- The World Wide Web (WWW)
- Electronic mail (Email)
- Chat
- Voice Over Internet Protocol (VoIP)

1. The World Wide Web (WWW) :

The World Wide Web (WWW) or web in short, is an ocean of information, stored in the form of trillions of interlinked web pages and web resources. The resources on the web can be shared or accessed through the Internet.

Earlier, to access files residing in different computers, one had to login individually to each computer through the Internet. Besides, files in different

computers were sometimes in different formats, and it was difficult to understand each other's files and documents.

Sir Tim Berners-Lee — a British computer scientist invented the revolutionary World Wide Web in 1990 by defining three fundamental technologies that lead to creation of web:

- **HTML** — HyperText Markup Language or HTML is a language which is used to design standardised Web Pages so that the Web contents can be read and understood from any computer across the globe.

It uses tags to define the way page content should be displayed by the web browser. Basic structure of every webpage is designed using HTML.

- **URI** — Uniform Resource Identifier or URI is a unique identifier to identify a resource located on the web.

URI identifies a resource (hardware or software) either by its location or by its name or by both.

- **URL** is Uniform Resource Locator and provides the location and mechanism (protocol) to access the resource.

Examples of URI identifying resources using location (i.e., URL) are:

<https://www.mhrd.gov.in>,
<http://www.ncert.nic.in>,
<http://www.airindia.in>, etc.

URL is sometimes also called a web address. However, it is not only the domain name, but contains other information that completes a web address, as depicted below:

Diagram illustrating the structure of a URL: <http://www.ncert.nic.in/textbook/textbook.htm>. The domain name is www.ncert.nic.in.

In the above URL, **http is the protocol name**, it can be https, http, FTP, Telnet, etc. **www is a subdomain. ncert.nic.in is the domain name.**

Note: These days it is not mandatory to mention protocol and subdomain while entering a URL. The browser automatically prefixes it.

URL: A Uniform Resource Locator (URL) is an address that indicates the location of a specific file or resource on the World Wide Web (WWW).

A URL specifies the site of a target saved on a local or networked computer. A file, directory, HTML page, image, application, and more can all be the target.

Ex: <https://www.cbse.gov.in/>

Absolute Address: Absolute URLs offer a full address for a website or other resource on the Internet. All the details required to find a resource are in an absolute URL.

It employs the following structure:

scheme://server/path/resource,

Where the **scheme** specifies the resource's access method.

The **server** determines the computer's name on which the resource is stored.

The **path** specifies the order of directories leading to the target.

The last directory in the way is the target if the resource is omitted.

Ex: <https://www.cbse.gov.in/cbsenew/cbse.html>

Relative Address: A relative URL usually contains the path and, if present, the resource; it does not include the scheme or server.

The forward slash is the first character in the relative path, which directs the browser to stay on the current website.

A relative URL would look like this –

Ex: /cbsenew/cbse.html

• **HTTP — The HyperText Transfer Protocol** is a set of rules which is used to retrieve linked web pages across the web. It's more secure and advanced version is HTTPS.

Many people confuse the web with the Internet. The Internet as we know is the huge global network of interconnected computers, which may or may not have any file or webpage to share with the world.

The web on the other hand is the interlinking of a collection of WebPages on these computers which are accessible over the Internet.

WWW today gives users access to a vast collection of information created and shared by people across the world. It is today the most popular information retrieval system.

2. Electronic Mail (Email):

Email is the short form of electronic mail. It is one of the ways of sending and receiving message(s) using the Internet. An email can be sent anytime to any number of recipients at anywhere.

The message can be either text entered directly onto the email application or an attached file (text, image audio, video, etc.) stored on a secondary storage. An existing file can be sent as an attachment with the email, so no need to type it again.

To use email service, one needs to register with an email service provider by creating a mail account. These services may be free or paid.

Some of the popular email service providers are Google (gmail), Yahoo (yahoo mail), Microsoft (outlook), etc. However, many organisations nowadays get customised business email addresses for their staff using their own domain name.

For example, username@companyname.com.

Following are some of the common facilities available for an email user:

1. Creating an email, attaching files with an email, saving an email as draft for mailing later. Creating email is also termed as composing.
2. Sending and receiving mail. Same email can be sent to multiple email addresses, simultaneously.
3. Sending the copy of mail, as carbon copy (cc) or blind carbon copy (bcc).
4. Forwarding a received email to other user(s)
5. Filtering spam emails
6. Organising email in folders and sub folders
7. Creating and managing email ids of the people you know.
8. Setting signature/footer to be inserted automatically at the end of each email
9. Printing emails using a printer or saving as files.
10. Searching emails using email address or email subject text.

3. Chat :

Chatting or Instant Messaging (IM) over the Internet means communicating to people at different geographic locations in real time through text message(s).

It is a forum where multiple people connect to each other, to discuss their common interests. Two individuals can also send messages instantly. The sender types a message and sends it; the receiver immediately receives the message and can read and revert through text message. All this happens in real time, as if the sender and receiver were sitting in the same place.

For a successful chat session, the communicating parties should be online simultaneously, and use the same chat application.

With ever increasing internet speed, it is now possible to send image, document, audio, video as well through instant messengers.

It means, the communicating parties can talk to each other through an audio call or through a video call. Moreover, it is also possible to chat through text, audio and video in a group. Thus, we can have group chat or group calls.

Applications such as WhatsApp, Slack, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, etc., are examples of instant messengers.

Some of these applications support instant messaging through all the modes — text, audio and video.

4. VoIP:

Voice over Internet Protocol or VoIP, allows us to have voice call (telephone service) over the Internet, i.e., the voice transmission over a computer network rather than through the regular telephone network.

It is also known as Internet Telephony or Broadband Telephony.

But to avail the phone service over the Internet, we need to have an Internet connection with reasonably good speed.

VoIP works on the simple principle of converting the analogue voice signals into digital and then transmitting them over the broadband line.

There are two major advantages of a VoIP—

- These services are either free or very economical, so people use them to save on cost. That is why these days even international calls are being made using VoIP.
- VoIP call(s) can be received and made using IP phones from any place having Internet access.

Hence, VoIP has increased the portability and functionality of the voice calling system. Incoming phone calls can be automatically routed to the VoIP phone as soon as it is connected to the Internet.

The only disadvantage of VoIP is that its call quality is dependent on Internet connection speed. Slow Internet connection will lead to poor quality voice calls.

CBSE QUESTIONS - MCQs

1. In the _____ field of the e-mail, enter the recipients whose address you want to hide from other recipients.
(A) Carbon Copy (B) To
(C) **Blind Carbon Copy** (D) All of the above
2. A mail or message sent to a large number of people indiscriminately without their consent is called **spam**
3. Receiving irrelevant and unwanted emails repeatedly is an example of **Spam (or) spamming**.
4. Which of the following Internet services is used for instant messaging ?
(A) **Chat** (B) Email
(C) WWW (D) Python

CBSE - QUESTIONS & ANSWERS

1. **What is Internet and how does it differ from World Wide Web (WWW)?**
A) The Internet is a vast network of interconnected computer networks facilitating global communication and data exchange. The World Wide Web (WWW), on the other hand, is a system of interlinked hypertext documents accessed via the Internet.
2. **Define the following term : WWW**
A) The **World Wide Web (WWW)** is an interconnected network of web pages and documents accessible through the Internet.
3. Rushil thought “WWW” and “Internet” are synonyms i.e., they meant same and can be used interchangeably. But the teacher said that they are not same. Help him to understand the meaning of both the terms with the help of a suitable example of each.

A) The **Internet** is a system of linked networks that are worldwide in scope and facilitate data communication services such as remote login, file transfer, electronic mail, the World Wide Web and newsgroups.

OR

It is a network of networks spread across the globe, all of which are connected to each other.

OR

The Internet is a public network of devices like desktop computers, laptops, servers, tablets, mobile phones, other handheld devices, printers, scanners, etc.

Example: Network of computers to perform E-commerce, E-Governance etc.

WWW can be defined as a hypertext information retrieval system on the Internet.

OR

WWW is the universe of the information available on the internet.

OR

WWW consists of web pages, which use HTML to interchange information on the internet.

OR

The World Wide Web (WWW) or web in short is a collection of information stored in the form of hyperlinked web pages and web resources.

Example, www.google.com

4. Expand URL. Identify the protocol and domain in the following URL :

<https://epathshala.nic.in/topics.php?len=en>

A) URL : Uniform Resource Locator

Protocol - https

Domain - epathshala.nic.in

5. Briefly explain the term URL. Also give one example of it.

Ans. URL stands for Uniform Resource Locator. It provides the location and mechanism (protocol) to access the resource, available on the web. URL is sometimes also called a web address.

Example: <http://www.ncert.nic.in>

6. Ratiis doing a course in networking. She is unable to understand the concept of URL. Help her by explaining it with the help of suitable example.

A) URL: It stands for Uniform Resource Locator. It provides the location and mechanism (protocol) to access the resources over the internet. URL is sometimes also called a web address. It not only contains the domain name, but other information as well that completes a web address.

Examples:

<https://www.cbse.nic.in>, <https://www.mhrd.gov.in>, <http://www.ncert.nic.in>,
<http://www.airindia.in>, etc.

7. Expand URL. Explain URL with the help of an example.

A) Uniform Resource Locator

Each website has a unique address called URL.

For example: <https://cbse.nic.in>

8. What do you understand by the term VoIP ? Give two examples of software/apps based on VoIP.

A) VoIP stands for Voice over Internet Protocol.

It is an Internet service which makes audio and video calls possible from any Internet connected device.

9. Expand the following terms related to Computer Networks: a. SMTP b. POP

c. FTP

d. VoIP

A) a. SMTP: Simple Mail Transfer Protocol

b. POP: Point to Point Protocol

c. FTP: File Transfer Protocol

d. VoIP: Voice over Internet Protocol

Topic 5

Website: Introduction, difference between a website and webpage, static vs dynamic web page, web server and hosting of a website.

Website : Each one of us might have visited one or the other website. A website in general contains information organised in multiple pages about an organisation. A website can also be created for a particular purpose, theme or to provide a service.

A **website** (usually referred to as a site in short) is a **collection of web pages related through hyperlinks, and saved on a web server.**

A visitor navigates from one page to another by clicking on **hyperlinks**. Also, all the pages of a website are integrated **under one domain name** and have a common theme and template.

For example, the website of NCERT will have all the pages related to NCERT, viz., textbooks, syllabus, events, resource materials, etc., under one domain name and having a common design theme.

To access a website, one has to type the address of the website (URL) in the address bar of a browser, and press enter. The home page of the website will be displayed.

Purpose of a Website :

We are living in an Internet era where the whole world is connected. A **website's purpose** is to make the information available to people at large.

For example, a company might like to advertise or sell its products, a government organisation may like to publish circulars, float tenders, invite applications or get feedback from various stakeholders.

A website is a means that helps to communicate with people in a specific, transparent and user friendly manner. Therefore, while developing a website, the first question to ask is why the website is being created, and what should be its pages so that it serves the required purpose.

Basically, a website should be user friendly and provide information to users with minimum efforts. A website should be designed keeping in mind different categories of people that will be visiting the site.

Some of the common purposes for which websites are designed are listed below:

- Selling products and delivering services
- Posting and finding information on the internet
- Communicating with each other
- Entertainment purposes
- Disseminating contents and software

Web Page:

A web page (also referred to as a page) is a document on the WWW that is viewed in a web browser.

Basic structure of a web page is created using HTML (HyperText Markup Language) and CSS (Cascaded Style Sheet).

A web page is usually a part of a website and may contain information in different forms, such as:

- text in the form of paragraphs, lists, tables, etc.
- images
- audio
- video
- software application
- other interactive contents

Additionally, various styling and formatting are applied on a web page to make it attractive and organised. Further, program codes called scripts are used to define the manner in which the page will behave on different actions.

Scripts make a web page interactive. **JavaScript** is the most popular and commonly used scripting language. However, **Python** and **PHP** are also used to apply scripting on a web page.

The first page of the website is called a **home page**. It generally contains information and links to all the related web pages. Each web page has a unique address that is visible on the address bar. Hence if we want to view a particular

web page, its address has to be typed in the address bar of the browser. The web pages that are linked to form a website share a unique domain name.

For example, <https://swayam.gov.in/> is a website by the Government of India to deliver online courses for School, College and University students and teachers. It is a collection of multiple web pages that link to different courses related information.

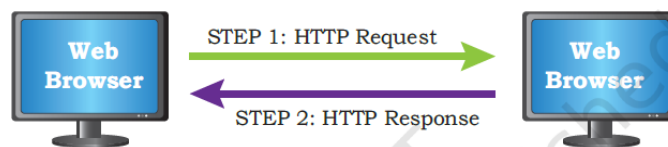
Static and Dynamic Web Pages:

A **web page** can be static or dynamic. A **static webpage** is one whose content always remains static, i.e., does not change for person to person.

When a web server receives a request (from browser) for a static web page, it just locates the page on its storage media and sends it to the browser of the client. No additional processing is performed on the page.

Hence, a static web page remains the same for all users until someone changes its code manually.

Static web pages are generally written in HTML, JavaScript and/or CSS and have the extension .htm or .html.



Working of a static web page

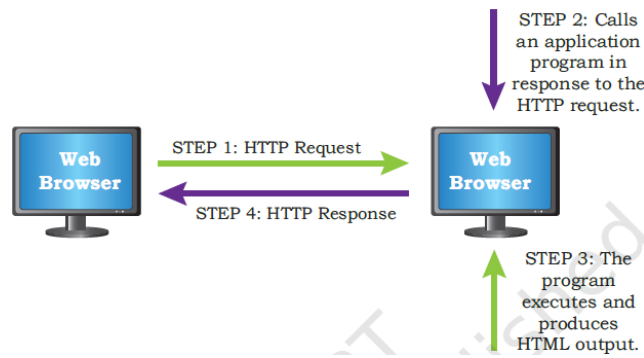
On the other hand, a **dynamic web page** is one in which the content of the web page can be different for different users. The difference in content may be because of different choices made by the user. When a request for a dynamic web page is made to the web server, it does not simply retrieve the page and send.

Before sending the requested web page, the server may perform some additional processes like getting information from the database, updating date and time, updating weather information, etc. **The content of such pages changes frequently.** They are more complex and thus take more time to load than static web pages.

Dynamic web pages can be created using various languages such as **JavaScript, PHP, ASP.NET, Python, Java, Ruby, etc.** These are complex to construct and design, as the code to perform the additional operations has to be added. Such server side code allows the server to change its content each time the page is loaded.

Further, most dynamic pages are linked to databases so that each time the page is uploaded, the required information from the databases is retrieved to update the web page. Few common examples of dynamic web pages are **those**

web pages displaying the date, time, and weather report or having e-commerce applications.



Working of a dynamic web page

Web Server :

A **web server** is used to store and deliver the contents of a website to clients such as a browser that request it. A web server can be software or hardware.

When talking about a web server as computer hardware, it stores web server software and a website's contents (HTML pages, images, CSS stylesheets, and JavaScript files). The server needs to be connected to the Internet so that its contents can be made accessible to others.

When talking about a web server as a software, it is a specialised program that understands URLs or web addresses coming as requests from browsers, and responds to those requests. The server is assigned a unique domain name so that it can be accessed from anywhere using the domain name.

To develop and test a website using a personal computer, we need to first install a web server on that computer. The web browser from the client computer sends a request (HTTP request) for a page containing the desired data or service. The web server then accepts, interprets, searches and responds (HTTP response) to the request made by the web browser. The requested web page is then displayed in the browser of the client. If the server is not able to locate the page, it sends a page containing the error message (Error **404** – page not found) to the client's browser.

Hosting of a Website :

Web hosting is a service that allows us to put a website or a web page onto the Internet, and make it a part of the World Wide Web.

Once a website is created using a hardware server, we need to connect it to the Internet so that users across the globe can access.

On the other hand, we can rent server resources (CPU, RAM, and storage) from a cloud service provider and host our locally created website there. This is done by uploading the files constituting the website (HTML, CSS, JavaScript, images, databases, etc.) from the local computer onto the space allocated on the

server. For this, we have to avail the services of a web hosting service provider. These services for using the server's resources such as RAM, hard disk, bandwidth, etc., are usually paid and these resources can be increased or decreased as per the loads on the website.

A web server whether it is a local server or a cloud server when connected to the Internet is assigned a unique numeric address on the Internet called IP address.

This IP address needs to be mapped to a textual name called **domain name** of the website. This is because it is not convenient for users to remember a numeric IP address.

Thus, for accessing a website, the user enters the domain through a browser (URL). The domain name has to be registered (purchased) with an authorised agency.

How to host a website?

To host a website, follow the steps given below:

- Select the web hosting service provider that will provide the web server space as well as related technologies and services such as database, bandwidth, data backup, firewall support, email service, etc. This has to be done keeping in mind the features and services that we want to offer through our website.
- Identify a domain name, which best suits our requirement, and get it registered through domain name Registrar.
- Once we get web space, create logins with appropriate rights and note down IP address to manage web space.
- Upload the files in properly organised folders on the allocated space.
- Get domain name mapped to the IP address of the web server.

The **domain name system** (DNS) is a service that does the mapping between domain name and IP address. When the address of a website is entered in a browser, the DNS finds out the IP address of the server corresponding to the requested domain name and sends the request to that server.

CBSE – MCQs

1. A _____ is a collection of interconnected _____ designed with a goal in mind.

- (A) webpage, website
- (B) web browser, webpage
- (C) server, client
- (D) **website, webpage**

2. Collection of hyper linked documents available on the internet is known as

- i. **Website**
- ii. Webpage
- iii. Web Server
- iv. Web Hosting

Q. ASSERTION (A) and REASONING (R) based questions.

Mark the correct choice as

- (i) Both (A) and (R) are true and (R) is the correct explanation for (A).
- (ii) **Both (A) and (R) are true and (R) is not the correct explanation for (A).**
- (iii) (A) is true and (R) is false.
- (iv) (A) is false but (R) is true.

3. Assertion (A) : A static webpage does not change for each person visiting the web page.

Reason (R) : When a web server receives a request for a dynamic web page, it locates and updates the page and sends it to the browser of the client.

4. _____ is a service that allows to put a website or a web page on the Internet.

- (a) Web Server (b) Web Browser
(c) **Web Hosting** (d) Domain Name System

CBSE - QUESTIONS & ANSWERS

1. Explain the terms Web page and Home Page.

A) Web Page: A Web Page is a part of a website and is commonly written in HTML. It can be accessed through a web browser.

Home Page: It is the first web page you see when you visit a website.

2. Priyanka, a beginner in IT field has just started learning web technologies. Help her in understanding the **difference between website and web pages** with the help of a suitable general example of each.

A) The difference between a website and a web page is that a **website** is a collection of different web pages containing information on a particular topic.

A **web page** is an individual page of a big website usually containing more specific information. If we compare a website with a book, then a webpage can be compared with a single page of that book.

3. Aman, a freelance web site developer, has been assigned a task to design few web pages for a book shop. Help Aman in deciding out of static web page and dynamic web page, what kind of web pages should be designed by clearly differentiating between static and dynamic web pages on at least two points

A) Differentiation between static and dynamic web pages:

Static Web Page	Dynamic Web Page
1. Content of this type of webpage cannot be changed at run time.	1. Content of this type of webpage can be changed at run time.

2. No interaction with server's database is possible in case of static web pages.

2. Interaction with server's database is possible in case of dynamic web pages.

4. Arshiya is a web developer and one of her clients wants her to design a web page to accept donations for an NGO. Which type of web page (static/dynamic) will she create ?

A) Dynamic Webpage.

5. For web pages where the information is changed frequently, for example, stock prices, weather information which out of the following options would you advise ?

a) Static web page b) Dynamic web page

Justify your answer.

A) Dynamic Web Page

6. What is a web server ? How is it different from web browser ?

A) A web server is used to store and deliver the contents to clients that request it.

Web Browser	Web Server
A web browser sends requests to the server for content.	Web server receives requests from the web browser and sends the requested content in response.

7. Briefly explain the basic concepts of a web server and web hosting.

A) **Web server:** A web server is used to store and deliver the contents of a website to clients such as a browser that request it. A web server can be software or hardware.

Web hosting: It is a service that allows to put a website or a web page onto the Internet, and make it a part of the World Wide Web.

8. Define the following terms : Web Hosting

A) **Web hosting** is a service that provides storage for a website's files and network infrastructure that makes the website available on Internet.

9. Danny has created a website on Python resources on his laptop. Now, he wants that others should be able to access his website and use the resources. What should he do to achieve his objective ?

A) Web Hosting / Publishing the website /
Uploading the Website on Webserver

10. Navya has just created a website for her company and now need to host it. Briefly discuss the role of a web server in hosting a website.

A) **Role of web server in hosting a website:**

A web server is the main centralized computer system that hosts and runs the websites. It has a computer program that distributes web pages as they are

requisitioned. The basic role of the web server is to store, process and deliver the web pages to the users as and when required.

Topic 6

Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

Browser :

A browser is a software application that helps us to view the web page(s). In other words, it helps us to view the data or information that is retrieved from various web servers on the Internet. Some of the **commonly used web browsers** are Google Chrome, Internet Explorer, Mozilla Firefox, Opera, etc.

A web browser essentially displays the HTML documents which may include text, images, audio, video and hyperlinks that help to navigate from one web page to another.

The initial web browsers like Mosaic used to support HTML documents containing plain text (static website) only, but nowadays with the advancement of technology, modern web browsers allow us to view interactive and dynamic websites.



In addition to this, most modern browsers allow a wide range of visual effects, use encryption for advanced security and also have cookies that can store the browser settings and data.

Browser Settings: Every web browser has got certain settings that define the manner in which the browser will behave. These settings may be with respect to privacy, search engine preferences, download options, auto signature, autofill and autocomplete feature, theme and much more.

Each browser application allows us to change or customise its settings in a user friendly manner.

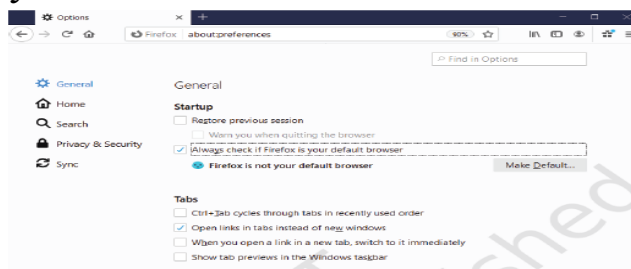
Change the browser settings using the open source browser, Mozilla Firefox :

Open Mozilla Firefox, and on the top right corner of the browser window, click the Menu button.



Mozilla Firefox Menu button

From the drop down button, select Options. The preferences and Options window will be displayed in the browser.



Preference and options page

On the left side, there are multiple Panels to choose from: General, Home, Search, Privacy and Security and Sync.

General Panel: Some of the options that the panel contains are as follows:

- setting the default browser
- language and appearance of text
- downloading files and applications
- firefox update settings
- browsing and network settings

Home Panel: This panel contains options to set the home page of the browser, browser window and tab settings.

Search Panel: This panel contains options to edit the settings of the search engine used by Firefox.

Privacy and Security Panel: This panel contains options to secure the browser and data. It includes the following:

- enhanced tracking protection
- forms and passwords
- history and address bar
- cookies and site data
- permission to view pop ups windows and install addons

Sync Panel: This panel contains options to set up and manage a Firefox account which is needed to access all services given by Mozilla. Make the desired settings and close the browser settings window. The changes made in the browser settings will be applied.

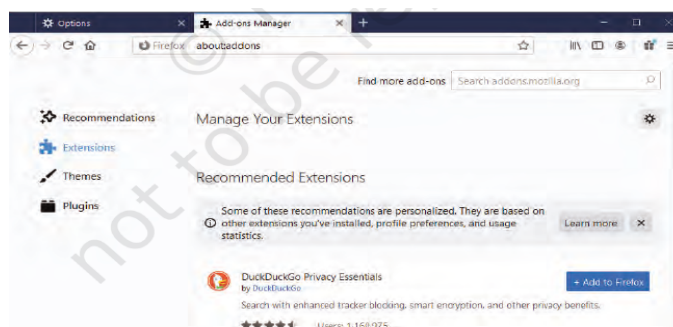
Add-Ons and Plug-ins

Add-ons and plug-ins are the tools that help to extend and modify the functionality of the browser. Both the tools boost the performance of the browser, but are different from each other.

A Flash player is required to play a video in the browser.

Plug-ins	Add-Ons
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A plug-in is a complete program or may be a third-party software.	Add-on is not a complete program and so is used to add only a particular functionality to the browser.
A plug-in is a software that is installed on the host computer and can be used by the browser for multiple functionalities and can even be used by other applications as well.	An add-on is also referred to as extension in some browsers.
Ex: Flash, Java	Ex: Ad blockers, Adding the functionality of a sound and graphics card is an example of an add-on.



Add-ons and plug-ins

To add an extension,

Click the Options button on the top right corner of the browser and select the Addons option.

Click the Extensions Panel option on the left.

On the right, options to Manage your Extensions will appear. There will be a list of enabled, disabled and recommended extensions. Make the desired selections and close the add-ons window.

Similarly, **to add plug-ins**, click Plug-ins options on the left side of the browser window.

Make the desired selections to enable or disable the required plug-ins.

Cookies: A cookie is a text file, containing a string of information, which is transferred by the website to the browser when we browse it.

This string of information gets stored in the form of a text file in the browser.

The information stored is retransmitted to the server to recognise the user, by identifying pages that were visited, choices that were made while browsing various menu(s) on a particular website.

It helps in customising the information that will be displayed, for example the choice of language for browsing, allowing the user to auto login, remembering the shopping preference, displaying advertisements of one's interest, etc.

Cookies are usually harmless and they can't access information from the hard disk of a user or transmit virus or malware. It is the browser on our computer which stores and manages the cookies.

However, viruses can also be tricked as cookies and cause harm to a computer. One can disable cookies by changing the Privacy and Security settings of our browser.

CBSE QUESTIONS - MCQs

1. Which of the following is a web browser ?
(A) Microsoft Windows (B) Android
(C) **Microsoft Edge** (D) Ubuntu
2. Which of the following is **not** a web browser ?
(i) Opera (ii) Google Chrome
(iii) **Linux** (iv) Mozilla Firefox
3. Which amongst the following is **not** an example of a browser?
i. Chrome ii. Firefox
iii. **Avast** iv. Edge
3. _____ helps to enhance the functionality of the web browsers.
(A) Extension (B) Plugin
(C) Add-on (D) **All of the above**

Q. ASSERTION AND REASONING based questions. Mark the correct choice as

- i. Both A and R are true and R is the correct explanation for A
 - ii. Both A and R are true and R is not the correct explanation for A
 - iii. A is True but R is False
 - iv. A is false but R is True
4. **Assertion (A):** - Internet cookies are text files that contain small pieces of data, like a username, password and user's preferences while surfing the internet.
Reasoning (R):- To make browsing the Internet faster & easier, its required to store certain information on the server's computer.
A) iii

5. **Assertion (A):** Cookies are small text files stored locally by the client's web browser to remember the "name-value pair" that identifies the client.

Reason (R) : Cookies are primarily used to track users' physical locations.

- a. Both A and R are true and R is the correct explanation for A
- b. Both A and R are true but R is not the correct explanation for A
- c. A is True but R is False

d. A is false but R is True

Ans. c

6. I :

- am a small text file
- created on a user's computer
- contain small pieces of data – like a username, password and user's browsing history as well as preferences.
- May help to improve user's web browsing experience.
- Who am I?

A) Cookies

7. I can keep you signed in.

I can remember your site preferences.

I can give you locally relevant content.

Who am I ?

A) Cookies

CBSE - QUESTIONS & ANSWERS

1. Define a web browser.

A) It is a software/tool, which allows us to view/access the content of WebPages.

2. Name any two popular web browsers.

A) Mozilla Firefox, Google Chrome

3. Define the following terms :

a) Plug-ins

b) Add-ons

A) **Plug-ins** are complete software/third party software Plug-ins are software components that add a specific feature to an existing computer program.

Plug-ins enable customization in a supported program.

Add-ons are not complete software/third party software. Add-ons are software that can be added to a computer program to increase its capabilities or a program utility.

4. Give examples of any two Plug-ins.

A) Java, Flash, Adobe Acrobat, Quicktime

5. What do you understand by the term cookies ? Give any two benefits of cookies.

A) A cookie is a small piece of data that is transferred to the user's computer along with the content requested by the user.

Benefits :

A. To analyze how the user is using the website

B. To enhance the website's usability.

C. To help the website recognize the user's computer activity (website's

login ids, shopping carts, surfing activity)

D. To customize the website's experience for a user

6.What are cookies? How can we disable cookies?

A) This is a small text file which contains the name of the website that it has come from and a unique ID tag.

OR

A cookie is a text file created by the web server while browsing websites and gets stored on the user's computer.

We can disable cookies by changing the Privacy and Security settings of the browser.

OR

We can disable cookies by selecting the Do Not Allow option when prompted whether to allow cookies for a website.

7. Explain the concept of browser cookies and mention one advantage of using them.

A) Browser cookies: Small pieces of data stored on our digital devices by websites to remember information and personalize our experience.

Advantage: Improve user experience by remembering preferences, like our preferred language and other settings.

8. With reference to browsing the websites, briefly explain the term cookie. Also mention any two points of significance of it.

A) A **cookie** is a small piece of data that a website sends to a user's web browser. The browser stores this data and sends it back to the website each time the user visits it again.

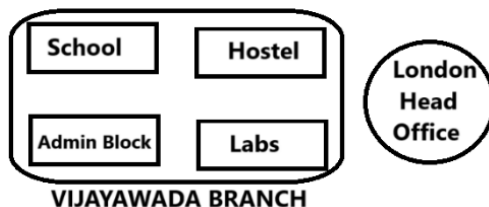
Significance of cookies from the following:

1. Helps in analyzing the user's browsing pattern/interests.
2. Helps in recognizing the user's computer activity(website's loginids, shopping carts)
3. Helps in customizing the website's experience for a user.

V.V.IMP - NETWORKS PROBLEM (5 Marks)

SPECIAL QUESTION WITH ALL MODELS

PTL Educational institutions, a multinational educational organisation, is looking to establish a school in Vijayawada with 4 blocks. Blocks are School, Hostel, Admin Block, Labs. Its Head office is located in London. As a network engineer, you have to propose solutions for various queries.



The shortest distances between the departments/offices are as follows:

School to Hostel	60 M
School to Admin Block	115 M
School to Labs	110 M
Hostel to Admin Block	130 M
Hostel to Labs	50 M
Admin Block to Labs	70 M
Vijayawada Branch to London Head Office	8000 KM

The number of computers in each department/office is as follows:

School	50
Hostel	5
Admin Block	10
Labs	120
London Head Office	30

Types of Questions as a gist:

- (i) Server Location
- (ii) Topology & Suitable Cable Layout
- (iii) Switch/Hub & Repeater, etc
- (iv) Type of Network
- (v) Website Type
- (vi) VOIP
- (vii) Plug-ins
- (viii) Internet Accessibility
- (ix) Hilly Area Signals

I. Suggest the most suitable wing (appropriate location) in the Vijayawada Branch School Setup, to **install the server** (to get the best connectivity for maximum number of computers).

Also, give a reason to justify your suggested location.

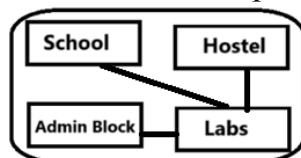
A) The server should be installed(placed) in the “**Labs**” block, as it has the most number of computers.

II. Suggest the topology and draw a suitable cable layout (most efficient cable layout for connecting all the blocks of Vijayawada Branch School) of wired network connectivity between the blocks in Vijayawada Branch School.

A) Layout 1 (Server location to all other locations)

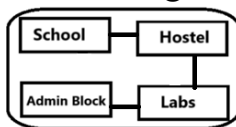
For very fast and efficient connections between various blocks within the campus suitable topology: **Star Topology**

(Connecting from the building with max. number of computers)



Layout 2 (Least cable length)

Bus topology (considering minimum building to building distance)



III. (a) Which networking device would you suggest the company to purchase to **interconnect all the computers within different blocks** in Vijayawada Branch School?

A) Switch/hub should be placed in all blocks as it is used to connect computers within each building.

(b) What is the **purpose** of following device? Where will you install them?
Switch/Hub

A) The purpose of switch/hub is **to connect various computers together in a network**.

Switch/Hub should be placed in each block i.e School, Hostel, Admin Block and Labs to interconnect nodes in those blocks.

(Switch/Hub to be placed in all wings School, Hostel, Admin Block, Labs as each of the buildings has more than one computer.)

(c) What is the **purpose** of following device? Where will you install them?

(Suggest the placement of the following devices with justification if the company wants minimized network traffic) **Repeater**

A) Repeater : Repeater is used to be placed **between the blocks where the distance between them is more than 100 meters**.

As per layout one, Repeater should be installed/placed between School block to labs block as distance between them is more than 100 meters.

Between the other locations, no repeater is required as distance between them is less than 100 meters.

(Note : But as per some text books information, we require to arrange a Repeater if the distance is more than 70 meters)

(d) Which device can be used to **connect** the network of Vijayawada Branch School **to the internet**?

This device should be able to receive data, analyse it and then transmit it to the network.

A) Router

IV. (a) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Admin to Hostel. Justify.

A) LAN, as the distance between them is less than 1 or 2 kilometers. (As computers are placed with-in the same campus with-in a small distance)

(b) The organisation is considering establishing a network connection between Vijayawada Branch School and its head office in London. Which type of network—LAN, MAN, or WAN—will be created? Justify your answer.

A) WAN (Wide Area Network) will be created as the offices are located in different cities.

(c) PTL Educational Institutions, wanted to start a new School in Managalagiri, which is 15 Kilometers away from Vijayawada Branch School. Which type of network—LAN, MAN, or WAN—will be created between these two schools? Justify your answer.

A) MAN (Metropolitan Area Network) will be created as the distance between those two locations is 15 Kilometers. (More than LAN range and less than WAN range).

(d) The organisation want to establish Wi-Fi connection between the computers in “Hostel” block. Which type of network—LAN, MAN, WAN or PAN—will be created in “Hostel” block? Justify your answer.

A) PAN (Personal Area Network) will be created as those computers in Hostel block can connect to Wi-Fi Router.

V. (a) The organisation plans to develop an interactive website that will enable its employees to monitor their performance after login. Would you recommend a static or dynamic website, and why?

A) A dynamic website is recommended as it can display the dynamic performance data (which differs from employee to employee) of each employee.

(b) The organisation is planning to get its **website** designed which will allow students **to see their results after registering themselves** on its server. Out of the static or dynamic, which type of website will you suggest?

A) Dynamic

VI. (a) Ms. Abhilasha, working in London office, is creating a software for conducting program for the teachers of Vijayawada Branch School. Which protocol would help her in voice transmission over a computer network ?

A) VOIP/Voice over Internet Protocol

(b) VoIP technology is to be used which allows one to make voice calls using a broadband internet connection. Expand the term VoIP.

A) Voice Over Internet Protocol

(c) Many employees were finding it difficult to cope up with work pressure and hence were showing stress related symptoms. In order to improve the mental health of its employees, HR planned to conduct an online session with a mental health expert from Mumbai. Out of the options given below, suggest the protocol that will help to send the voice signals over Internet to conduct the session successfully.

(a) FTP

(b) SMTP

(c) VOIP

(d) POP

(d) The company wanted to develop a healthy relation among the employees, therefore the HRA planned an online session with everyone so that they could play games from their devices. Suggest the protocol that helped to send the voice signals over Internet.

A) VoIP (Voice over Internet Protocol)

(e) The company wants to do a collaborative project where the employees of London and Vijayawada Branch School would collaborate and do the project.

Therefore, the HR planned a series of webinars that employees could attend from their devices being online. Suggest the protocol that helped to send the voice signals over the Internet.

Also, give an example of a video conferencing software that helps to connect all the employees.

A) Protocol: VoIP or Voice over Internet protocol

Example of video conferencing software: Google Meet, Zoom, Webex, MS Teams, Whereby, etc

(f) Due to pandemic school had to adopt Online classes. Suggest the protocol that is used for sending the voice signals over internet. Also, give an example of an application of WWW that helped the teachers to send messages instantly to the students.

A) Protocol name : VoIP (Voice Over Internet Protocol)

Example of an application of WWW that helped the teachers to send messages instantly to the students: WhatsApp, Slack, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, Instant Messenger, etc

(g) Now a day, video-conferencing software is being used frequently by the company to discuss the students performance with the parents. Name any one video conferencing software.

‘Also mention the protocol which is used internally in video conferencing software.

A) Video Conferencing software: Teams, Zoom, Skype etc. (Any one)

Protocol of Video Conferencing software: VOIP

(h) There is one more branch of PTL Educational Organisation in Hyderabad. The schools want to link Vijayawada Branch School with Hyderabad Branch School. Suggest the software(s) or app(s) to share the files and videos.

A) Google Drive, Whatsapp, Email attachments, Microsoft Onedrive, etc

(i) Which of the following will you suggest to establish the **online face to face communication** between the people in the London office with teachers in Vijayawada Branch Office?

a) Cable TV

b) Email

c) Video conferencing

d) Text chat

(vii) The Organisation's manager Ms. Ritu is worried as to how she can **extend and modify the functionality of the web browser**. Help her by giving names of any two tools.

A) Extensions

Plug-ins

Add-Ons

(viii) The company wants **internet accessibility** in all the wings. Suggest a suitable technology.

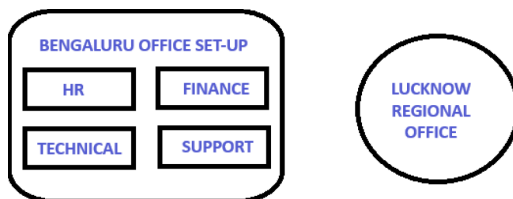
A) Broadband

(ix) The company is planning to link its head office situated in New Delhi with the offices in hilly areas. Suggest a way to connect it economically.

A) Radio Waves

CBSE SAMPLE PAPER::2024.25

ABC Pvt. Ltd., a multinational technology company, is looking to establish its Indian Head Office in Bengaluru, and a regional office branch in Lucknow. The Bengaluru head office will be organized into four departments: HR, FINANCE, TECHNICAL, AND SUPPORT. As a network engineer, you have to propose solutions for various queries listed from I to V.



The shortest distances between the departments/offices are as follows:

HR TO FINANCE	65 M
HR TO TECHNICAL	80 M
HR TO SUPPORT	70 M
FINANCE TO TECHNICAL	60 M
FINANCE TO SUPPORT	75 M
TECHNICAL TO SUPPORT	50 M
BENGALURU OFFICE TO LUCKNOW	1900 KM

The number of computers in each department/office is as follows:

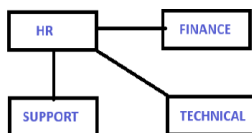
HR	175
FINANCE	35
TECHNICAL	50
SUPPORT	15
LUCKNOW OFFICE	40

- I.** Suggest the most suitable department in the Bengaluru Office Setup, to install the server. Also, give a reason to justify your suggested location.
- II.** Draw a suitable cable layout of wired network connectivity between the departments in the Bengaluru Office.
- III.** Which networking device would you suggest the company to purchase to interconnect all the computers within a department in Bengaluru Office?
- IV.** The company is considering establishing a network connection between its Bengaluru Head Office and Lucknow regional office. Which type of network—LAN, MAN, or WAN—will be created? Justify your answer.
- V.** The company plans to develop an interactive website that will enable its employees to monitor their performance after login. Would you recommend a static or dynamic website, and why?

ANSWERS

A) I. The server should be installed in the HR department as it has the most number of computers.

II. Star topology



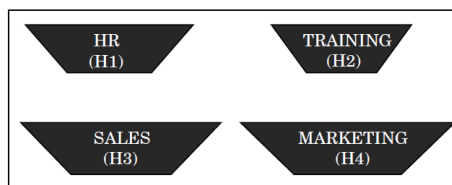
III. Switch/Hub

IV. WAN (Wide Area Network) will be created as the offices are located in different cities.

V. A dynamic website is recommended as it can display the dynamic performance data (which differs from employee to employee) of each employee.

CBSE SUPPLEMENTARY PAPER::2023.24

34. Classpoint Pvt. Ltd., Pune is a company that deals with development and training of software. They have different divisions HR (H1), Training (H2), Sales (H3) and Marketing (H4). The layout of the Pune branch is :



The management wants to connect all the divisions as well as all the computers of each division (H1, H2, H3 and H4).

Distance between the divisions are as follows :

H1 to H2	90m
H1 to H3	145m
H1 to H4	88m
H2 to H3	110m
H2 to H4	80m
H3 to H4	160m

Number of computers in each division :

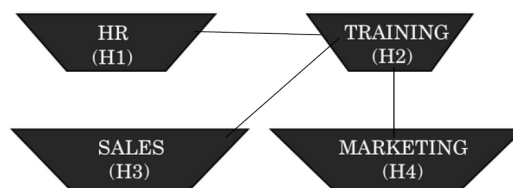
Division	Number of Computers
H1	100
H2	220
H3	160
H4	140

Based on the above specifications, answer the following questions :

- Suggest the topology and draw the most suitable cable layout for connecting all the divisions.
- Classpoint Pvt. Ltd. plans to establish a new office in Dubai. Out of LAN, MAN and WAN, what kind of network will be created to connect Pune office with Dubai office ?
- Suggest the division for the placement of server in Pune office. Explain the reason for your selection.
- Suggest the placement of switch/hub with justification.
- Ms. Abhilasha, working in Dubai office, is creating a software for conducting program for the employees of Pune branch. Which protocol would help her in voice transmission over a computer network ?

ANSWERS

1. A) STAR TOPOLOGY



ii) A) WAN

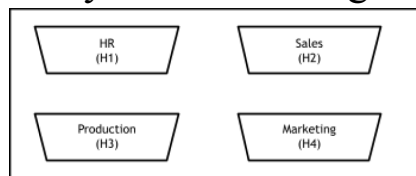
iii) A) Server should be placed in H2 division as it has the maximum number of computers.

iv) A) Switch/hub should be placed in all blocks as it is used to connect computers within each building.

v) A) VOIP/Voice over Internet Protocol

CBSE BOARD PAPER::2023.24

FULLMAN Tech, Bengaluru is a company that deals with software development. They have different divisions HR (H1), Sales (H2), Production (H3) and Marketing (H4). The layout of the Bengaluru branch is :



The management wants to connect all the divisions as well as all the computers of each division (H1, H2, H3 and H4).

Distance between the divisions are as follows :

H1 to H2	76 m
H1 to H3	185 m
H1 to H4	88 m
H2 to H3	140 m
H2 to H4	125 m
H3 to H4	160 m

Number of computers in each of the division :

Division	Number of Computers
H1	140
H2	340
H3	180
H4	260

Based on the above specifications, answer the following questions :

(i) Suggest the topology and draw the most efficient cable layout for connecting all the divisions of Bengaluru branch.

(ii) FULLMAN Tech is expanding its reach and therefore it establishes a new office in Delhi. Out of LAN, MAN, and WAN what kind of network will be created to connect Bengaluru office with Delhi Office ?

(iii) Suggest the division for the placement of server in Bengaluru branch. Explain the reason for your selection.

(iv) Suggest the placement of the following devices in Bengaluru branch:

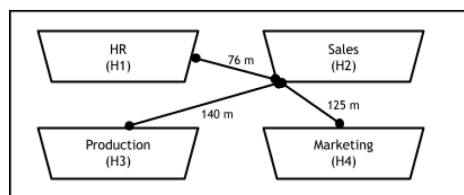
Repeater

Switch/Hub

(v) The company's manager Ms. Ritu is worried as to how she can extend and modify the functionality of the web browser. Help her by giving names of any two tools.

ANSWERS

(i) Star Topology



(ii) WAN

(iii) Sales (H2).

Maximum number of computers in Sales division

(iv) (a) Between Sales (H2) and Production (H3), Between Sales(H2) and Marketing(H4)

(b) One in each of the divisions HR(H1), Sales(H2), Production(H3), Marketing(H4)

(v) Extensions, Plug-ins, Add-Ons

CBSE ADDITIONAL PRACTICE PAPER::2023.24

34. A large educational campus with multiple departments and buildings is planning to establish an efficient network infrastructure to connect its various facilities. The campus comprises five main buildings, each with specific distance and computer requirements:

Distance between various buildings:

Building A to Building B: **50** meters

Building B to Building C: **30** meters

Building C to Building D: **30** meters

Building D to Building E: **35** meters

Building E to Building C: **40** meters

Building D to Building A: **120** meters

Building D to Building B: **145** meters

Building E to Building B: **65** meters

Each building hosts a varying number of computers:

Building A: **55** computers

Building B: **180** computers

Building C: **60** computers

Building D: **55** computers

Building E: **70** computers

Based on the above specifications, answer the following questions:

(a) Suggest a possible cable layout for connecting the buildings in an efficient and effective way.

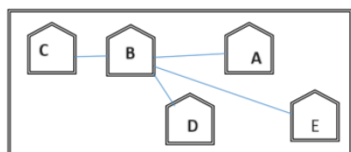
(b) Name the topology used for above cable layout.

(c) Suggest the most suitable place to install the server of this organisation.

(d) Suggest the placement of the following devices. (i) Hub/Switch (ii) Repeater

(e) The company wants to link its head office in 'A' building to its Office in Sydney What type of network this connection result into?

ANSWERS



(a)

(b) Star

- (c) Building B as it has maximum number of computers.
 (d) (i) Hub/Switch should be placed in each building
 (d) (ii) Repeater is placed between Building B to building D
 (e) WAN

CBSE SAMPLE PAPER::2023.24

34. XYZ Media house campus is in Delhi and has 4 blocks named Z1, Z2, Z3 and Z4. The tables given below show the distance between different blocks and the number of computers in each block.

Block Z1 to Block Z2	80 metres
Block Z1 to Block Z3	65 metres
Block Z1 to Block Z4	90 metres
Block Z2 to Block Z3	45 metres
Block Z2 to Block Z4	120 metres
Block Z3 to Block Z4	60 metres

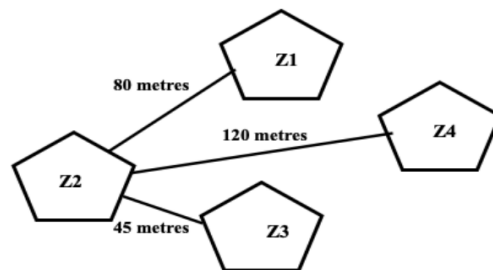
Block	Number of Computers
Z1	135
Z2	290
Z3	180
Z4	195

The company is planning to form a network by joining these blocks.

- i. Out of the four blocks on campus, suggest the location of the server that will provide the best connectivity. Explain your response.
- ii. For very fast and efficient connections between various blocks within the campus, suggest a suitable topology and draw the same.
- iii. Suggest the placement of the following devices with justification
 - (a) Repeater
 - (b) Hub/Switch
- iv. VoIP technology is to be used which allows one to make voice calls using a broadband internet connection. Expand the term VoIP.
- v. The XYZ Media House intends to link its Mumbai and Delhi centers. Out of LAN, MAN, or WAN, what kind of network will be created? Justify your answer.

Answers

- 34. i.** Z2 as it has maximum number of computers.
ii. For very fast and efficient connections between various blocks within the campus suitable topology: Star Topology



iii. Repeater: To be placed between Block Z2 to Z4 as distance between them is more than 100 metres.

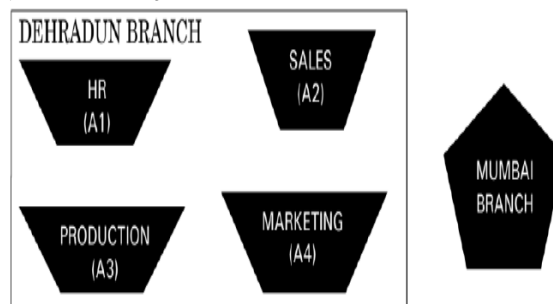
Hub/Switch: To be placed in each block as each block has many computers that needs to be included to form a network.

iv. Voice Over Internet Protocol

v. WAN as distance between Delhi and Mumbai is more than 40kms.

CBSE BOARD COMPARTMENT PAPER::2022.23

34. AWESOME Private Ltd, Dehradun is a company that deals with hardware components. They have different divisions HR (A1), Sales (A2), Production (A3) and Marketing (A4). The layout of the Dehradun branch is :



The company also has a branch in Mumbai. The management wants to connect all the divisions as well as the computers of each division (A1, A2, A3, A4).

Distance between the wings are as follows:

A3 to A1	32m
A1 to A2	53m
A2 to A4	29m
A4 to A3	110m
A3 to A2	750m
A1 to A4	200m
Dehradun Head Office to Mumbai Office	1656 KM

Number of computers in each wing:

A1	70
A2	140
A3	55
A4	70

Based on the above specifications, answer the following questions :

(a) Suggest the topology and draw the most efficient cable layout for connecting all the divisions of the Dehradun branch.

(b) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Production (A3) with Sales (A2).

(c) Suggest the placement of the server. Explain the reasons for your selection.

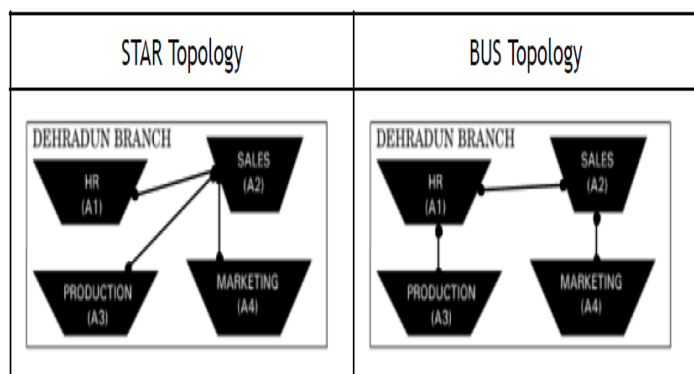
(d) Suggest the placement of the Switch/Hub with justification.

(e) The company wants to do a collaborative project where the employees of Dehradun and Mumbai would collaborate and do the project. Therefore, the HR planned a series of webinars that employees could attend from their devices being online. Suggest the protocol that helped to send the voice signals over the Internet.

Also, give an example of a video conferencing software that helps to connect all the employees.

ANSWERS

(a)



b) LAN

c) Placement : SALES (A2)

It has maximum number of computers.

d) One switch/hub in each division.

A switch/hub will be placed in each division to interconnect devices present in that division.

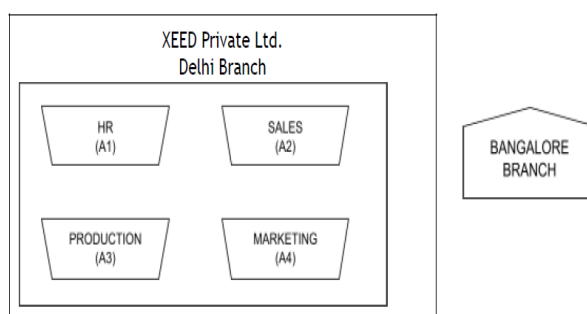
(e) **Protocol:** VoIP or Voice over Internet protocol

Example of video conferencing software: Google Meet, Zoom, Webex, MS Teams, Whereby, etc

CBSE BOARD PAPER::2022.23

32. XEED Private Ltd., Delhi is a company that deals with educational toys. They have different divisions HR(A1), Sales(A2), Production(A3) and Marketing(A4).

The layout of the Delhi branch is:



The company also has a branch in Bangalore. The management wants to connect all the divisions as well as all the computers of each division (A1,A2, A3, A4).

Distance between the wings are as follows:

A3 to A1	25 m
A1 to A2	40 m
A2 to A4	25 m
A4 to A3	20 m
A3 to A2	30 m
A1 to A4	170 m
Delhi Office Head Office to Bangalore Office	2154 KM

Number of computers in each of the wing:

A1	50
A2	40
A3	110
A4	60

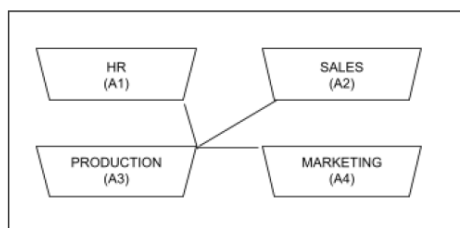
Based on the above specifications, answer the following questions:

- (i) Suggest the topology and draw the most suitable cable layout for connecting all the divisions of Delhi branch.
- (ii) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Production (A3) with the Bangalore branch.
- (iii) Which device can be used to connect the network of Delhi branch to the internet? This device should be able to receive data, analyse it and then transmit it to the network.
- (iv) Suggest the placement of Switch/Hub with justification.
- (v) Many employees were finding it difficult to cope up with work pressure and hence were showing stress related symptoms. In order to improve the mental health of its employees, HR planned to conduct an online session with a mental health expert from Mumbai. Out of the options given below, suggest the protocol that will help to send the voice signals over Internet to conduct the session successfully.

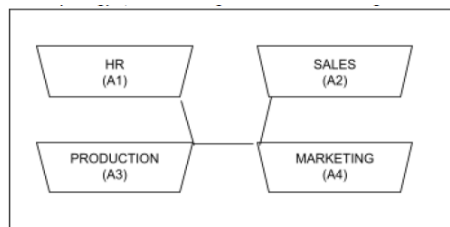
(a) FTP (b) SMTP (c) VOIP (d) POP

ANSWERS

32 (i) Star topology (Connecting from the building with max. number of computers)



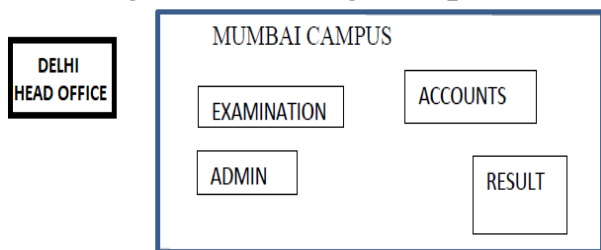
Bus Topology (considering minimum building to building distance)



- (ii) WAN (iii) Router
 (iv) Switch/Hub should be placed in all the buildings to interconnect nodes in each building
 (v) (c) VOIP

CBSE SAMPLE PAPER::2022.23

32. Prime Computer services Ltd. is an international educational organization. It is planning to set up its India campus at Mumbai with its head office in Delhi. The Mumbai office campus has four main buildings-ADMIN, ACCOUNTS, EXAMINATION and RESULT. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (v), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various buildings:

ADMIN TO ACCOUNTS	55 m
ADMIN TO EXAMINATION	90 m
ADMIN TO RESULT	50 m
ACCOUNTS TO EXAMINATION	55 m
ACCOUNTS TO RESULT	50 m
EXAMINATION TO RESULT	45 m
DELHI Head Office to MUMBAI campus	2150 m

Number of computers installed at various buildings are as follows:

ADMIN	110
ACCOUNTS	75
EXAMINATION	40
RESULT	12
DELHI HEAD OFFICE	20

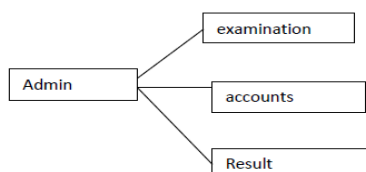
- (i) Suggest the most appropriate location of the server inside the MUMBAI campus (out of the four buildings) to get the best connectivity for maximum number of computers. Justify your answer.
- (ii) Suggest and draw cable layout to efficiently connect various buildings within the MUMBAI campus for a wired connectivity.
- (iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of MUMBAI campus?
- (iv) Company is planning to get its website designed which will allow students to see their results after registering themselves on its server. Out of the static or dynamic, which type of website will you suggest?
- (v) Which of the following will you suggest to establish the online face to face communication between the people in the ADMIN office of Mumbai campus and Delhi head office?

- a) Cable TV b) Email
c) Video conferencing d) Text chat

ANSWERS

32. i. Server should be installed in Admin department as it has maximum number of computers.

ii.



Star topology

iii. Hub/Switch

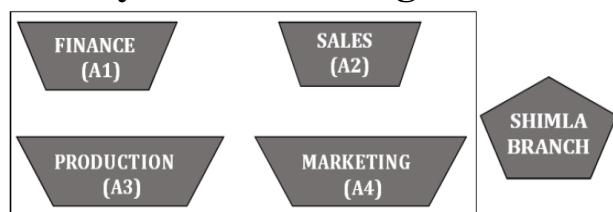
iv. Dynamic

v. Video conferencing

CBSE COMPARTMENT PAPER::2022 (Term2)

13) ABC Private Ltd., Bangalore has different divisions, Finance (A1), Sales (A2), Production (A3) and Marketing (A4).

The layout of the Bangalore branch is :



The company also has a branch in Shimla. The management wants to connect all the divisions as well as all the computers of each division (A1, A2, A3, A4).

Distance between the branches are as follows:

A3 to A1	25 m
A1 to A2	40 m
A2 to A4	25 m
A4 to A3	120 m
A3 to A2	990 m
A1 to A4	170 m

The number of computers in each branch is as follows:

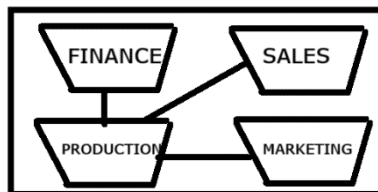
A1	50
A2	40
A3	110
A4	60

Based on the above specifications, answer the following questions :

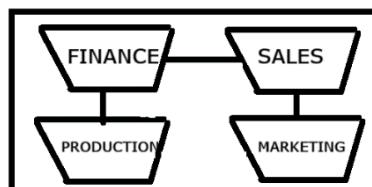
- (a) Suggest the topology and draw the most suitable cable layout for connecting all the divisions of Bangalore branch.
- (b) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Production (A3) with Shimla branch.
- (c) Suggest the placement of the following devices: (i) Repeater (ii) Switch/Hub
- (d) The company wanted to develop a healthy relation among the employees, therefore the HRA planned an online session with everyone so that they could play games from their devices. Suggest the protocol that helped to send the voice signals over Internet.

ANSWERS

13.a) As per direct connectivity with the server:



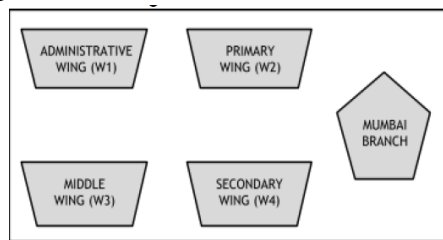
As per shortest distance:



- (b) WAN
- (c) (i) Repeater should be placed between A3 and A2 wings
- (ii) Switch/Hub should be placed in all divisions A1, A2, A3 and A4
- (d) VoIP (Voice over Internet Protocol)

CBSE BOARD PAPER::2021.22 (Term2)

13. ABC International School, Delhi has different wings Administrative Wing (W1), Primary Wing (W2), Middle Wing (W3) and Secondary Wing (W4) as shown in the diagram:



The school also has a branch in Mumbai. The school management wants to connect all the wings as well as all the computers of each wing (W1, W2, W3, W4).

Distance between the wings are as follows:

W3 to W1	85 m
W1 to W2	40 m
W2 to W4	25 m
W4 to W3	120 m
W3 to W2	150 m
W1 to W4	170 m

Number of computers in each of the wing:

W1	125
W2	40
W3	42
W4	60

Based on the above specifications, answer the following questions :

(i) Suggest the topology and draw the most suitable cable layout for connecting all the wings of Delhi branch.

(ii) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting

(a) Administrative Wing (W1) with Middle Wing (W3)

(b) Administrative Wing (W1) with the Mumbai branch

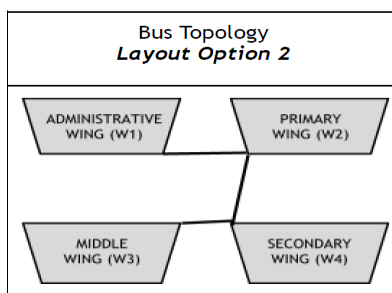
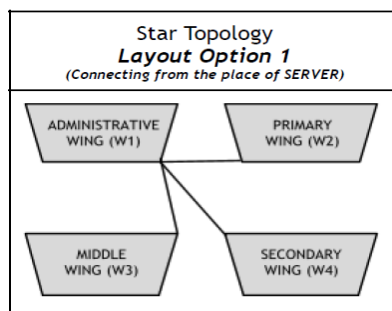
(iii) Suggest the placement of the following devices with justification:

(a) Repeater **(b)** Switch/Hub

(iv) Due to pandemic school had to adopt Online classes. Suggest the protocol that is used for sending the voice signals over internet. Also, give an example of an application of WWW that helped the teachers to send messages instantly to the students.

ANSWERS

13. i)



(ii) (a) LAN

(b) WAN

(iii) (a) Repeater to be placed based on layout drawn in part(i), between two physically connected buildings wherever the distance between the **two buildings is more**.

(b) Switch/Hub to be placed in all wings W1, W2, W3 and W4 as each of the buildings has more than one computer.

(iv) **Protocol name : VoIP (Voice Over Internet Protocol)**

Example of an application of WWW that helped the teachers to send messages instantly to the students: WhatsApp, Slack, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, Instant Messenger, etc

CBSE SAMPLE PAPER :: 2021.22 (Term 2)

3. “Anutulya Creations”-A start-up fashion house has set up its main centre at Kanpur, Uttar Pradesh for its dress designing, production and dress supplying activities. It has 4 blocks of buildings.(4)

Distance between the various blocks is as follows:

A to D 50 m

A to P 60 m

A to S 110 m

D to S 60 m

P to S 50 m

P to D 150 m

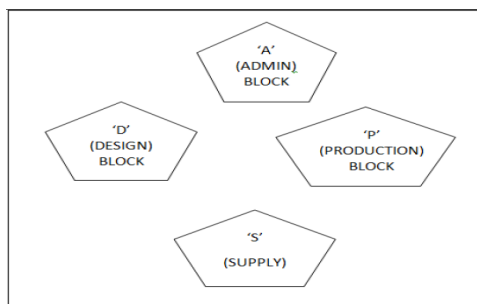
Numbers of computers in each block:

Block A - 20

Block D - 80

Block P - 15

Block S - 8



Based on the above specifications, answer the following questions:

(a) Out of LAN, WAN and MAN, what type of network will be formed if we interconnect different computers of the campus? Justify.

(b) Suggest the topology which should be used to efficiently connect various blocks of buildings within Kanpur centre for fast communication.

Also draw the cable layout for the same.

(c) Suggest the placement of the following device with justification i. Repeater
ii. Hub/Switch

(d) Now a day, video-conferencing software is being used frequently by the company to discuss the product details with the clients. Name any one video conferencing software.

‘Also mention the protocol which is used internally in video conferencing software.

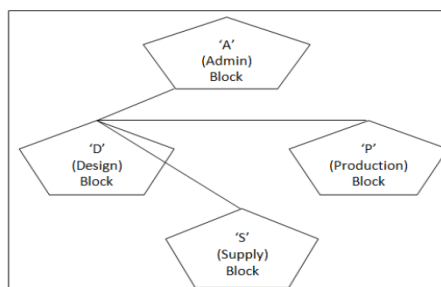
ANSWERS

3. (a) LAN

As computers are placed with-in the same campus with-in a small range.

(b) Star topology

Cable Layout:



c) i. Repeater should be placed in between Block ‘D’ (Design) and Block ‘P’ as distance is more.

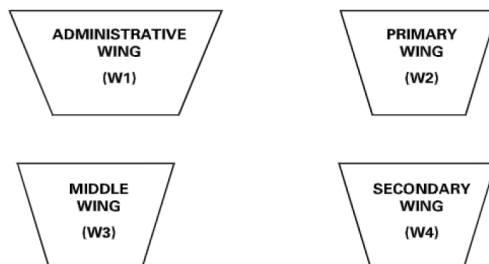
ii. Hub/Switch should be placed in each building to connect various computers together.

d) Video Conferencing software: Teams, Zoom, Skype etc. (Any one)

Protocol of Video Conferencing software: **VOIP**

CBSE COMPARTMENT 2021

40. ABC International School, Delhi has different wings as shown in the diagram:



Distance between the wings are as follows:

W3 to W1	70 m
W1 to W2	40 m
W2 to W4	15 m
W4 to W3	100 m
W3 to W2	120 m
W1 to W4	80 m

Number of computers in each of the wings:

W1	125
W2	40
W3	42
W4	60

Based on the above information, answer the following questions :

- Suggest the most suitable cable layout for the above connections.
- In which wing would you place the server ? Explain the reason for your selection.
- Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Administrative Wing and Middle Wing.
- Suggest the placement of the following devices with justification :
 - Repeater
 - Switch/Hub
- There is one more branch of ABC International School in Mussoorie. The schools want to link ABC International School, Delhi with ABC International School, Mussoorie. Suggest the software(s) or app(s) to share the files and videos.

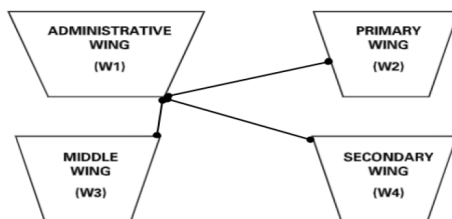
Questions for visually impaired students only :

With reference to computer networking, answer the following questions briefly :

- What is the significance of a switch in a computer network ?
- Mention the name of any two network topologies.
- What is MODEM ?
- Explain Gateway briefly.
- Expand VoIP.

ANSWERS

40. a)



b) Administrative Wing.

It has the maximum number of computers

c) LAN

d) (i) Not required

OR

W1 to W4 (as the distance $> 70\text{m}$)

(ii) In each building

(e) Google Drive, Whatsapp, Email attachments, Microsoft Onedrive, etc

Questions for visually impaired students only :

(a) It is an intelligent networking device used to connect multiple computers in a network

(b) STAR, BUS

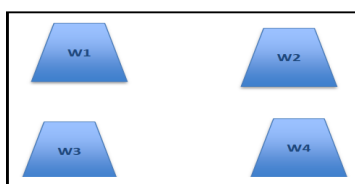
(c) It stands for Modulator-Demodulator used to convert analogue signals to digital signals and vice versa

(d) Gateway is a key access point that acts as a gate between an organisation's network (Intranet) and outer network (Internet).

(e) Voice over Internet Protocol.

CBSE SAMPLE PAPER ::2020.21

40. A company in Mega Enterprises has 4 wings of buildings as shown in the diagram :



Center to center distances between various Buildings:

W3 to W1 - 50m

W1 to W2 - 60m

W2 to W4 - 25m

W4 to W3 - 170m

W3 to W2 - 125m

W1 to W4 - 90m

Number of computers in each of the wing:

W1 - 150

W2 - 15

W3 - 15

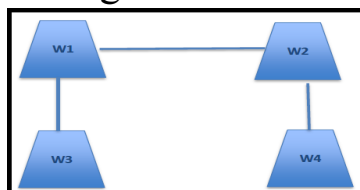
W4 - 25

Computers in each wing are networked but wings are not networked. The company has now decided to connect the wings also.

- i. Suggest a most suitable cable layout for the above connections.
- ii. Suggest the most appropriate topology of the connection between the wings.
- iii. The company wants internet accessibility in all the wings. Suggest a suitable technology.
- iv. Suggest the placement of the following devices with justification if the company wants minimized network traffic. a) Repeater b) Hub / switch
- v. The company is planning to link its head office situated in New Delhi with the offices in hilly areas. Suggest a way to connect it economically.

ANSWERS

40. i) Most suitable layout according to distance is:



ii) Star Topology

iii) Broadband.

iv). a) Not required. Repeaters may be skipped as per above layout (because distance is less than 100 m)

(Note : But as per some text books information, we require to arrange a Repeater if the distance is more than 70 m)

b) In every wing

iv) Radio Waves

Note : No Questions in 2019.20 Paper.

(Syllabus was different)

CBSE QUESTION BANK

5. Samarth is the hardware engineer of “Happy School”. He has been given the task of installing a network in the school lab which has around 40 computers.

i. Suggest the most suitable type of network topology he should use in order to maximise speed and make each computer independent of network breakdowns.

a. Bus Topology

b. Star Topology

c. Ring Topology

d. Mesh Topology

ii. In order to allow data transfer from server to only the intended computers which network device is required in the lab to connect the computers?

a. Switch

b. Hub

c. Router

d. Gateway

iii. After setting up the lab and internet in the lab, Samarth is now required to enable videos and animations to be played on the web browser for students of multimedia class. Which browser tool /service can be used for the same?

- a. Plug ins **b. Add ons**
- c. Control Panel d. Download Settings

iv. During an international exchange programme the students need to connect to a classroom in Russia using Skype. Samarth helps the students to connect. Which type of network service is being used ?

- a. Instant messaging b. Email messaging
- c. VoIP** d. WWW

v. Samarth has asked students of class 7 to identify different parts of URL. Help the students to choose the correct option for label 1 and 2.



- a. 1- Domain Name
2-Protocol

- b. 1- Protocol**
2-Domain Name

- c. 1. Domain name
2. subdomain

- d. 1-Protocol
2-subdomain

Q.10. The school offers Wi-Fi to the students of Class XII. For communication, the network security-staff of the school is having a registered URL "**schoolwifi.edu**". On 17th September 2017, emails were received by all the students regarding expiry of their passwords. Instructions were also given renew their password within 24 hours by clicking on particular URL provided. On the bases of the above case study, answer the questions given below:

i. Specify which type of cybercrime is it.

- a) Spamming **b) Phishing**
- c) Identity Theft d) Hacking

ii. URL stands for _____

- a) Universal Resource Loader
- b) Uniform Resource Locator**
- c) United Research Loader
- d) Uniform Resource Loader

iii. Unsolicited commercial email is known as:

- a) Malware b) Virus
- c) Spam** d) Spyware

iv. WiFi stands for _____

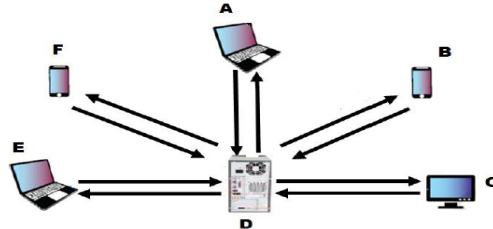
- a) Wireless Internet Frequent Interface

- b) Wireless Functioning
- c) Wireless Fidelity**
- d) Wire Free Internet

v. Ideally, what characters should be used in a password to make it strong?

- a) Letters and numbers only
- b) Mixed Case (Upper and Lower)
- c) Special characters
- d) All of above**

Q.13. Refer to the following diagram and answer the questions given below.



i. Which of the following devices acts as a server?

- a. A
- b. B
- c. C
- d. D**

ii. The arrow from device D to pointing to A represents?

- a. HTTP request
- b. HTTP response**
- c. HTTP request & response
- d. All of the above

iii. Which of the following device(s) can have IP Addresses?

- a. A
- b. D
- c. F
- d. All of the above**

iv. Identify the network topology of the above network :

- a. Ring
- b. Star**
- c. Bus
- d. None of the above

v. is a protocol (set of rules) used when transmitting files (data) over the world wide web.

- a. FTP
- b. HTTP**
- c. SMP
- d. None of the above

Q.14. Vidya Devi, a retired school principal, was inspired by her granddaughter who uses technology for her day to day activities. Being a learner and teacher all her life, she wanted to open an email account and interact with her friends and family. Her granddaughter created an email account for her and gradually she started sending mails to her friends and family. This was a big achievement for her. Her granddaughter explained how emails are sent, how to create an email address, what protocols are used. Some of these details were too technical for her, but she never gave up. There are few doubts/misconceptions in her mind which you can help her with.

i. Unsolicited e-mail advertising is known as

- a. newsgroup
- b. junk ads
- c. spam**
- d. none of the above

- ii. Which of the following is the correct format of email address?
- name@website@info
 - name@website.info**
 - www.nameofwebsite.com
 - name.website.com
- iii. Mail access starts with client when user needs to download email from the
- mail box**
 - mail server
 - IP server
 - Internet
- iv. To use email service, one needs to register with
- Internet Service Provider**
 - Email Service Provider
 - A company
 - No need to register
- v. Bcc stands for to send the copy of mail.
- Black carbon copy
 - Blue carbon copy
 - Blind carbon copy**
 - Block chain copy
- Q.17.** Ramanpreet has to work on his science project which deals with electromagnetic waves. A lot of research work is required by him for the same. He uses Google Chrome to search for the relevant matter.
- i. Google chrome is an example of a
- Website
 - Web browser**
 - Web Page
 - Web Page
- ii. He finally locates some useful information and clicks on the link provided to access the website. The link is actually known as a _____.
- Domain name
 - Web Page
 - URL**
 - IP address
- iii. As Ramanpreet works on his project, he collects and curates information. Whenever he clicks on the link the same piece of information is shown and the content is not clickable. Ramanpreet is accessing a/an _____ website.
- Dynamic
 - Textual
 - Outdated
 - Static**
- iv. A web cookie is a small piece of data that is
- sent from a website and stored in user's web browser while a user is browsing a website**
 - sent from user and stored in the server while a user is browsing a website
 - sent from root server to all servers
 - sent from the root server to other root servers
- v. HTML stands for _____

- a. Hyper Text Markup Link
- b. Hyper Text Markup Language**
- c. Hybrid Text Markup Language

SUMMARY

- A group of two or more similar things or people interconnected with each other is called **network**
- A **computer network** is an interconnection among two or more computers to share data and resources.
- Devices in a network can be connected either through **wired** or **wireless media**.
- Based on the geographical area covered and data transfer rate, computer networks are broadly categorised as **LAN**, **MAN** and **WAN**.
- The protocol or the set of rules that decide functioning of a LAN is called **Ethernet**.
- Local Area Network (**LAN**) is a network that connects digital devices placed at a limited distance of upto 1 km.
- Metropolitan Area Network (**MAN**) is an extended form of LAN which covers a larger geographical area like a city or a town.
- Wide Area Network (**WAN**) connects computers and other LANs and MANs, which are spread across different geographical locations of a country or in different countries or continents.
- A **repeater** is an electronic device that receives a weak signal and regenerates it.
- **Modem** (MOdulator DEModulator) refers to any such device used for conversion between analog signals and digital bits.
- A **hub** is a network device used to connect multiple devices to form a network or to connect segment(s) of LAN.
- A **switch** is a networking device that filters network traffic while connecting multiple computers or communicating devices.
- A **router** is a network device that can receive the data, analyse it and transmit to other networks.
- A **gateway** is a device that connects the organisation's network with the outside world of the Internet.
- The physical organisation of computers, cables and other peripherals in a network is called its topology. Common network **topologies** are Bus, Star, Tree, Mesh, etc.
- In **bus topology**, each communicating device connects to a common central transmission medium, known as bus.
- In **star topology**, each communicating device is connected to a central node, which is a networking device like a hub or a switch, through separate cables.
- In **tree topology**, multiple star and bus topologies are connected to a central cable, also called the backbone of the network.
- In **mesh topology**, each communicating device is connected with every other device in the network.
- The **Internet** is the largest WAN that connects millions of computers across the globe.

- Some of the **services** provided through the Internet are information sharing, communication, data transfer, social networking, e-commerce, etc.
- A Uniform Resource Locator (**URL**) is a standard naming convention used for accessing resources over the Internet.
- **Electronic mail** is a means of sending and receiving message(s) through the Internet.
- **Chatting** is communicating in real time using text message(s).
- Voice over Internet Protocol (**VoIP**) allows you to have voice calls over digital networks.
- A **website** is a collection of related web pages.
- A **web page** is a document that is viewed in a web browser such as Google Chrome, Mozilla Firefox, Opera, Internet Explorer, etc. It can be static or dynamic.
- A **static web page** is one whose content does not change for requests made by different people.
- A **dynamic web page** is one in which the content of the web page displayed is different for different users.
- A **web server** is a program or a computer that provides services to other programs or computers called clients.
- **Web hosting** is a service that allows you to post the website created locally so that it is available for all internet users across the globe.
- Every **browser** has got certain **settings** that define the manner in which the browser will behave. These settings may be with respect to privacy, search engine preferences, download options, auto signature, autofill and autocomplete feature and much more.
- **Add-ons** and plug-ins are the tools that help to extend and modify the functionality of the browser.
- A **cookie** is a text file containing a string of information which stores browsing information on the hard disk of your computer.

EXERSIZE

1. Fill in the blanks:

- To transmit data for sharing on a network, it has to be divided into smaller chunks called -----.
- The set of rules that decide the functioning of a network is called -----.
- A LAN can be extended up to a distance of ____ km.
- The ----- connects a local area network to the internet.
- The ----- topology is of hierarchical nature.
- is a standard naming convention used for accessing resources over the Internet.
- is a collection of related web pages.
- A----- is a computer that provides services to other programs or computers.

2. Expand the following:

- ARPANET
- ISP
- URL

3. Name the device for the following:

- a) It stands for Modulator Demodulator
- b) It regenerates the signals.

4. Differentiate between:

- a) MAN and WAN
- b) Website and web page
- c) Router and Gateway
- d) Bus and Star topology
- e) Static and Dynamic web pages

5. Define a network. What is the need of forming a network?

6. Give any two examples of networks.

7. Give any three applications on the Internet.

8. Name any two mail service providers.

9. Explain VoIP.

10. What is DNS?

11. Identify the type of topology from the following:

- a) Each node is connected with the help of a single cable.
- b) Each node is connected with central switching through independent cables.

12. Sahil, a Class X student, has just started understanding the basics of Internet and web technologies. He is a bit confused in between the terms “World Wide Web” and “Internet”. Help him in understanding both the terms with the help of suitable examples of each.

13. Murugan wants to send a report on his trip to the North East to his mentor. The report contains images and videos. How can he accomplish his task through the Internet?

14. Mampi is planning to open a company that deals with rural handicrafts. She wants to advertise about handicrafts on a social platform. Which Internet service she should use and why?

15. Ruhani wants to edit some privacy settings of her browser. How can she accomplish her task?

16. Shubham wants to play a video in his browser but he is not able to do so. A message on the screen instructs him to install the Adobe Flash Player plugin. Help him to add it in his browser.

17. When Joe typed a URL in the address bar of his browser, Error 404 was displayed? Why did this happen? What can be done to avoid it?

Other Important Points from NCERT Text Book

- **Think and Reflect:** It is possible to access your bank account from any part of the world. Find if the bank’s network is a LAN, MAN, WAN or any other type.
- An Internet service provider (ISP) is any organisation that provides services for accessing the Internet.
- Find and list a few ISPs in your region.
- To build a fully connected mesh topology of n nodes, it requires $n(n-1)/2$ wires.

- **Think and Reflex:** How will a bus and ring topology behave in case a node is down?
- Search Engine(s) like google.co.in, bing.com, duckduckgo.com, in.yahoo.com, etc., can be used to search and retrieve information when the address of the web page is not known.
- Visit NCERT, SWAYAM or any other website and note down URLs of some of the specific pages of that website.
- Find out some of the Web hosting service providers from both categories — free and paid.
- Mosaic was the first web browser developed by the National Centre for Supercomputing Application (NCSA).
- Mozilla Firefox is an open source web browser which is available free of cost and can be easily downloaded from the Internet.

Think and Reflect: Can we compare Addons and Plug-ins with utility software?

- First cookie software was created in 1994 at Netscape, for determining whether the person is a first time visitor or a re-visitor of their site.

RELATED QUESTIONS FROM OLD COMPUTER SCIENCE PAPERS

1) Mention one advantage of networking.

Ans: Advantages/Need for networking (Network Goals):

(i) **Resource Sharing:** Hardware Resources like printers, Softwares can be shared between all computers in the network.

(ii) **Reliability:** A file can have copies in two or more computers.

(iii) **Cost Factor**

(iv) **Communication Medium:** Using a network, it is possible for managers, working far apart, to prepare financial report of the company, etc

LAN,MAN,WAN,PAN

1. Assume that 50 employees are working in an organization. Each employee has been allotted a separate workstation to work. In this way, all computers are connected through the server and all these workstations are distributed over two floors. In each floor, all the computers are connected to a switch. Identify the type of network?

Ans: LAN(Local Area Network)

2) Daniel has to share the data among various computers of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.

Ans : MAN

3. Differentiate between PAN and LAN types of networks.

PAN (Personal Area Network)	LAN (Local Area Network)
A personal area network PAN is a computer network	LAN interconnects a high number of access or node points or stations

organized around an individual person.	within a confined physical area upto a kilometer
--	--

4. Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a Video.

Ans: PAN (Personal Area Network)

5. In networking, what-is WAN? How is it different from LAN?

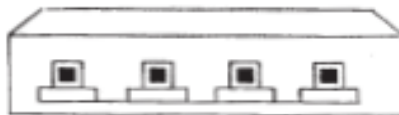
Ans A WAN (wide area network), is not restricted to a geographical location, although it might be confined within the bounds of a state or country. A WAN connects several LANs, and may be limited to an enterprise (a corporation or an organization) or accessible to the public. The technology is high speed and relatively expensive. The Internet is an example of a worldwide public WAN.

A LAN (local area network) is a group of computers and network devices connected together, usually within the same building or campus.

6) What is the difference between LAN and WAN?

Ans LAN (Local Area Network):

Interconnects a high number of access or node points or stations within a confined physical area. An example is the territory covered in a single office building that houses various departments/offices. All these areas are interconnected using a LAN.



WAN (Wide Area Network)

It is used to connect systems with no limitation of geographical area. It is used to serve many locations distributed over a large geographical area. A system of overnight teller machines used by a banking organisation covering the North of India is an example of a WAN. Internet is also an example of the same.

7) What is the difference between MAN and WAN?

8) What is the difference between LAN and WAN?

LAN	WAN
Diameter of not more than a few kilometers.	Span entire countries
A total data rate of at least several Mbps	Data rate less than 1 Mbps (Megabits per Second)
Complete ownership by a single organization	Owned by multiple organization
Very low error rates	Comparatively higher error rates

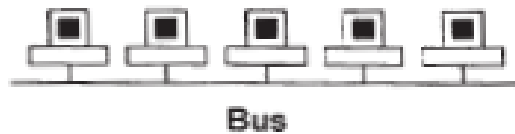
9) What is the difference between LAN and MAN?

TOPOLOGIES

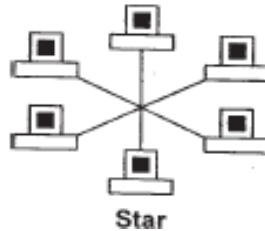
1) Differentiate between Bus Topology and Star Topology of Networks. What are the advantages and disadvantages of Star Topology over Bus Topology?

Ans:

Bus Topology: It is characterised by common transmission medium shared by all the connected hosts, managed by dedicated nodes. It offers simultaneous flow of data and control.



Star Topology: It is characterised by central switching node (communication controller) and unique path (point to point link) for each host. It is easy to add and remove additional hosts by upgrading the centralised node.



Advantages of Star Topology over Bus Topology:

- Faster communication as compared to Bus topology

- Independent line of connection allows freedom of removing or adding nodes from the network
- Fault detection is easy.
- Fault isolation is easy.

Disadvantages of Star Topology over Bus Topology:

- Expensive as compared to Bus topology
- Long cable length

2) Write two advantages and two disadvantages for STAR topology?

3) Write one advantage and one disadvantage of the following topologies in network:

- i) STAR Topology ii) BUS Topology

4) Mention one difference between Linear and Star topologies in networking.

5) Write the two advantages and two disadvantages of BUS Topology in network?

7) Give two advantages and disadvantages of following network topologies:

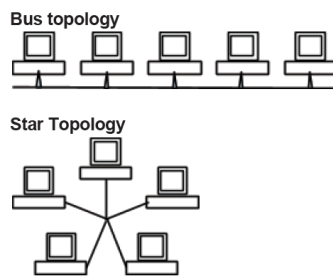
- i) BUS ii) Tree

8) Identify the type of topology on the basis of the following:

- a. Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.
- b. It has a single common data path connecting all the nodes.

Ans: a. Star Topology b. Bus Topology

9. Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

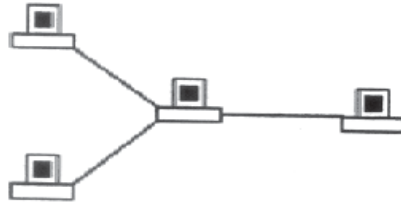


OR any valid illustration of Bus and Star Topology.

10) Write one advantage of Bus Topology of network. Also, illustrate how 4 computers can be connected with each other using star topology of network.

Ans Cable length required for this topology is the least compared to other networks.

Illustration of 4 computers connected with each other using star topology of network.



Theory Question : Communication Devices

1)What is the purpose of using a repeater in the context of networking?

2) What are repeaters?

A) A repeater is a network device that amplifies and restores signals for long distance transmission.

It is used in long network lines, which exceed the maximum rated distance for a single run.

Repeaters are of two types:

(i)Amplifier : amplifies all incoming signals over the network. (it amplifies both the signal and any concurrent noise)

(ii) Repeater : collected inbound packet and then retransmits the packet as if it were starting from the source station.

3) What is a Hub?

Ans)A Hub is an unintelligent network device, used for a central connection between two or more computers on a network. It will do broadcast.

Hubs are of two types:

(i) Active hubs: electrically amplify the signal as it moves from one connected device to another.

(ii) Passive hubs: allow the signal to pass from one computer to another without any change.

4) What is a Modem?

Ans) Modem is a Modulation Demodulation device that converts analog signal to digital signal and vice versa.

5) What is the purpose of using a MODEM?

6) What are Routers?

A) A router is a network device that is used to separate different segments in a network to improve performance and reliability. A router works like a bridge but can handle different protocols.

Compared to hubs and switches, routers are smarter still. Routers use a more complete packet address to determine which router or workstation should receive each packet next. Based on a network road map called a routing table routers can help ensure that packets are travelling the most efficient paths to their destination. If a link between routers fails, the sending router can determine an alternate route to keep traffic moving.

Other Important Question

Q. Differentiate between Switch and Hub.

A. Even though the purpose of both the devices are to connect different computers in a network, there are some differences.

Switch	Hub
Sends data only to the intended device (Unicasting)	Sends data to all connected devices (Broadcasting)
Intelligent device (can learn and store MAC addresses)	Not a intelligent device
More Secure, Higher Speed	Less Secure, Slower