Q1. What are the different types of networks?

Solution1: A network is a set of devices (offend referred to as nodes) connected by communication links to share the commutating resources. A node can be a computer, printer, smart phone, refrigerator, car or any other device capable of sending and/or receiving data generated by other nodes on the network. Depending on the needs of an organization and the type of technology used, LAN can be as simple as two PCs and a printer in someone's home office; or it can extend throughout a company and include audio and video peripherals.

Currently, LAN size is limited to a few kilometres.

LANs are designed to allow resources to be shared between personal computers or workstations.

The resources to be shared can include hardware (e.g., a printer), software (e.g., an application program), or data. One of the computers may be given a large capacity disk drive and may become a server to clients. Software can be stored on this central server and used as needed by the whole group. In addition to size, LANs are distinguished from other types of networks by their transmission media and topology.

Wide Area Network (WAN) A wide area network (WAN) provides long-distance transmission of data, image, audio, and video information over large geographic areas that may comprise a country, a continent, or even the whole world. A WAN can be as complex as the backbones that connect the Internet or as simple as a dial- up line that connects a home computer to the Internet.

We normally refer to the first as a switched WAN and to the second as a pint to- point WAN.

• The switched WAN connects the end systems, which usually comprise a router (internet- working connecting device) that connects to another LAN or WAN.

• The point-to-point WAN is normally a line leased from a telephone or cable TV provider that connects a home computer or a small LAN to an Internet service provider (ISP). This type of WAN is often used to provide Internet access.

Q4: What is the difference between a hub, modem, router and a Switch?

Solution4: There are various network connecting devices which are given here:
Hub: Those hubs which operate below the physical layer are passive hub. Those hubs which operate at the physical layer are called a repeater or an active hub. A passive hub is just a connector. It connects the wires coming from different branches. An active hub is actually a multipart repeater.

Router: Routers are conceptually similar to bridges, except that they are found in the network layer. They just take incoming packets from one line and forward them on another, just as all routers do, but the lines may belongs to different networks and use different protocols. A router is a three-layer device that routes packets based on their logical addresses (host-to-host addressing). A router normally connects LANs and WANs in the Internet and has a routing table that is used for making decisions' route. The routing tables are normally dynamic and are updated using routing protocols.

L2 Switch: When we use the term switch, we must be careful because a switch can mean two different things. We must clarify the term by adding the level at which the device operates. We can have a layer 2 (L2) switch or a layer 3 (L3) switch. The L3 switch is used at the network layer; it is a kind of router. The L2 switch performs at the physical and data link layers. A L2 switch is a bridge. A L2 switch, as a bridge does, makes a filtering decision

Q10: What is a Web Browser? Give some example of browsers.

Solution10: The WWW makes extensive use of hypertext documents which contain Multimedia data such as text, images, sounds, video clips etc. Links to other documents (situated anywhere on the web).
HTTP

The client/server protocol used to exchange hypertext documents is called HTTP (HyperText Transport Protocol). The main thing you need to know is that HTTP is a language spoken between your web browser (client software) and a web server (server software) so that they can communicate with each other and exchange files. HTTP is a "request-response" type protocol that specifies that a client will open a connection to a server then send a request using a very specific format. The server will then respond and close the connection. World Wide Web offers a way to access documents spread over the several servers over the internet and is the universe of network accessible information. These documents may contain texts, graphics, audio, video, hyperlinks. The hyperlinks allow the users to navigate between the documents.

Web Services

Web services allow exchange of information between the client and server applications on the WWW. Eg. Utility computing

World Wide Web

• WWW is also known as W3

.• August 1 was World Wide Web Day. The World Wide Web (WWW) was in 1989 at the CERN lab in Geneva, Switzerland, as a way forscientists to share knowledge.

• Tim Berners-Lee invented the World Wide Web in 1989. While working atCERN, he wrote the code for WWW using a NeXT computer, to share documents among researchers across the world using hyperlinks.

Q13. What is an Internet service Provider? Give some example of ISP. in india.

Solution13: Internet Services allows end users to access enormous amount of information such as audio, video, text, graphics, sound, software, and even idea over the internet. Following diagram shows four different categories of Internet Services.

SN	Service Description
1	File Transfer Protocol (FTP) Allows transferring files between any to machines.
2	Archie It's updated database of public FTP sites and their content. It helps to search a file by its name.
3	Gopher Used to search, retrieve, and display documents on remote sites.

Communication Services Various Communication Services are available that offer exchange of information with individuals or groups. Following are the examples of these services:

S.NO.	Service Description
1	Electronic Mail Used to send and receive electronic message over the internet.
2	Telnet Telnet is a terminal emulation program and allows a user to on a remote machine allows accessing the resources of another machine.
3	Newsgroup Offers a forum for people to discuss topics of common interests.
4	Internet Relay Chat (IRC) Allows the people from all over the world to communicate in real time.
5	Mailing Lists Used to organize group of internet users to share common information through e-mail.
6	Internet Telephony (VoIP) Allows the internet users to talk across internet to any PC equipped to receive the call.
7	Instant Messaging Offers real time chat between individuals and group of people. Eg. Yahoo messenger, MSN messenger.

Q14.Discuss the difference between MAC address, PORT address.

Solution14:

S.NO.	MAC Addresses	PORT Addresses
1	Destination address	Data link layer
2	Receiver	To another network
3	Source address	Transport layer
4	Destination address does not match	Application layer
5	Trailer	Sender and Receiver

Q9. Discuss TCP/1P model in detail.

Solution9: TCP/IP specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into , addressed, transmitted, routed and received at the destination. TCP/IP requires little central management and is designed to make networks reliable with the ability to recover automatically from the failure of any device on the network.

The two main protocols in the IP suite serve specific functions. TCP defines how applications can create channels of communication across a network. It also manages how a message is assembled into smaller packets before they are then transmitted over the internet and reassembled in the right order at the destination address. IP defines how to address and route each packet to make sure it reaches the right destination. Each gateway computer on the network to determine where to forward the message. A subnet mask tells a computer, or other network device, what portion of the is used to represent the network and what part is used to represent hosts, or other computers, on the network. Network address translation (NAT) is the virtualization of IP addresses. NAT helps improve security and decrease the number of IP addresses an organization needs.

Common TCP/IP protocols include the following:

Hypertext Transfer Protocol (HTTP) handles the communication between a web server and a web browser. handles secure communication between a web server and a web browser.File Transfer Protocol handles transmission of files between computers.

How does TCP/IP work?

TCP/IP uses the of communication in which a user or machine (a client) is provided a service, like sending a webpage, by another computer (a server) in the network.Collectively, the TCP/IP suite of protocols is classified as , which means each client request is considered new because it is unrelated to previous requests. Being stateless frees up network paths so they can be used continuously. The transport layer itself, however, is crateful. It transmits a single message, and its connection remains in place until all the packets in a message have been received and reassembled at the destination.

The TCP/IP model differs slightly from the seven-layer Open Systems Interconnection networking model designed after it. The OSI reference model defines how applications can communicate over a network.

Why is TCP/IP important?

TCP/IP is non-proprietary and, as a result, is not controlled by any single company. Therefore, the IP suite can be modified easily. It is compatible with all operating systems (Oases), so it can communicate with any other system. The IP suite is also compatible with all types of computer hardware and networks.

TCP/IP is highly scalable and, as a routable protocol, can determine the most efficient path through the network. It is widely used in current internet architecture.

The 4 layers of the TCP/IP model

TCP/IP functionality is divided into four layers, each of which includes specific protocols:

How are TCP/IP and IP different?

There are numerous differences between TCP/IP and IP. For example, IP is a low-level internet protocol that facilitates data communications over the internet. Its purpose is to deliver which contains routing information, such as source and destination of the data, and the data payload itself.

IP is limited by the amount of data that it can send. The maximum size of a single IP data packet, which contains both the header and the data, is between 20 and 24 bytes long. This means that longer strings of data must be broken into multiple data packets that must be independently sent and then reorganized into the correct order after they are sent.

Since IP is strictly a data send/receive protocol, there is no built-in checking that verifies whether the data packets sent were actually received.

In contrast to IP, TCP/IP is a higher-level smart communications protocol that can do more things. TCP/IP still uses IP as a means of transporting data packets, but it also connects computers, applications, web pages and web servers. TCP understands holistically the entire streams of data that these assets require in order to operate, and it makes sure the entire volume of data needed is sent the first time. TCP also runs checks that ensure the data is delivered.

As it does its work, TCP can also control the size and flow rate of data. It ensures that networks are free of any congestion that could block the receipt of data.

An example is an application that wants to send a large amount of data over the internet. If the application only used IP, the data would have to be broken into multiple IP packets. This would require multiple requests to send and receive data, since IP requests are issued per packet.

With TCP, only a single request to send an entire data stream is needed; TCP handles the rest. Unlike IP, TCP can detect problems that arise in IP and request retransmission of any data packets that were lost. TCP can also reorganize packets so they get transmitted in the proper order -- and it can minimize network congestion. TCP/IP makes data transfers over the internet easier.

TCP/IP model vs. OSI model

TCP/IP and OSI are the most widely used communication networking protocols. The main difference is that OSI is a conceptual model that is not practically used for communication. Rather, it defines how applications can communicate over a network. TCP/IP, on the other hand, is widely used to establish links and network interaction. The TCP/IP protocols lay out standards on which the internet was created, while the OSI model provides guidelines on how communication has to be done. Therefore, TCP/IP is a more practical model. The main similarity is in the way they are constructed as both use layers, although TCP/IP consists of just four layers, while the OSI model consists of the following seven layers: the application layer, enables the user -- software or human -- to interact with the application or network when the user wants to read messages, transfer files or engage in other network-related activities. the presentation layer, translates or formats data for the application layer based on the semantics or syntax that the app accepts. the session layer, sets up, coordinates and terminates conversations between apps.
the transport layer, handles transferring data across a network and providing error-checking mechanisms and data flow controls. the network layer, moves data into and through other networks. the data link layer, handles problems that occur as a result of bit transmission errors. the physical layer, transports data using electrical, mechanical or procedural interfaces. The upper layer for both the TCP/IP model and the OSI model is the application layer. Although this layer performs the same tasks in each model, those tasks may vary depending on the data each receives. The functions performed in each model are also similar because each uses a network layer and transport layer to operate. The TCP/IP and OSI models are each mostly used to transmit data packets. Although they will do so by different means and by different paths, they will still reach their destinations. The similarities between the TCP/IP model and the OSI model include the following: They are both logical models. They define networking standards. They divide the network communication process in layers. They provide frameworks for creating and implementing networking standards and devices. They enable one manufacturer to make devices and network components that can coexist and work with the devices and components made by other manufacturers. The differences between the TCP/IP model and the OSI model include the following: TCP/IP uses just one layer (application) to define the functionalities of the upper layers, while OSI uses three layers (application, presentation and session). TCP/IP uses one layer (physical) to define the functionalities of the bottom layers, while OSI uses two layers (physical and data link). The TCP/IP header size is 20 bytes, while the OSI header is 5 bytes. TCP/IP is a protocol-oriented standard, whereas OSI is a generic model based on the functionalities of each layer. TCP/IP follows a horizontal approach, while OSI follows a vertical approach. In TCP/IP, the protocols were developed first, and then the model was developed. In

OSI, the model was developed first, and then the protocols in each layer were developed. TCP/IP helps establish a connection between different types of computers, whereas OSI helps standardize routers, switches, motherboards and other hardware.

The history of TCP/IP

The Defence Advanced Research Projects Agency, the research branch of the U.S. Department of Defence, created the TCP/IP model in the 1970s for use in ARPANET, a wide area network that preceded the internet. TCP/IP was originally designed for the Unix OS, and it has been built into all of the Oases that came after it.

The TCP/IP model and its related protocols are now maintained by the Internet Engineering Task Force.