TOPIC 6: DATA COMMUNICATION&NETWORKING

Define the term data communication.
This is process through which one computer transfers data, instructions and information from one computer to another.

Explain the basic Model/Elements of data communication.
A sending device*that initiates an instruction to transmit data, instruction, or information.*
e.g., Computer A, which sends out signals to another computer (e.g., Computer B).
A communications device*that converts the data, instruction, or information from the sending device into signals that can be carried by a communications channel.e.g., Modem A, which converts the computer's digital signals into analog signals.*
A communications channel, *or path, over which the signals are sent.*e.g.*, A standard telephone line, along which the analog signals are sent.*
A receiving device*(i.e., Computer B) that accepts the signals from Computer A.*
Communications software*, which consists of programs that manage the transmission of data, instructions, and information between computers.*

Define the term Computer Network?
Anetwork consists of two or more computers that are linked together in order to share resources e.g printers, memory, exchange files and folders, allow electronic communication e.g Email etc. It is a system for communication among two or more computers.

Distinguish between physical transmission and wireless transmission
Physical transmission media*use wire, cable, and other physical materials to send communications signals while*
Wireless transmission *media send communications signals through the air or space using radio, microwave, and infrared signals(electromagnetic waves).*

Explain the importance of Computer Communication.

- *It allows sharing of hardware like printers.*
- *It allows sharing of software between two or more computers, hence reducing on cost.*
- *It allows sharing and transfer of data and information stored on other computers on the network.*
- *Facilitate communications between people e.g. through electronic-mail, Mobile phones,e.t.c.*
- *Computer communication has security & tight control measures over data access.*

- *It enables online learning and collaborative research.*
- *It allows access to common databases for example in banks.*
- *Has enabled improved travel service through e-bookings and e-reservation.*
- *Provides for online employment e.g. telecommuting*

Give the limitations of Computer Communications.

- ***Data theft**. If a computer is a standalone, physical access becomes necessary for any kind of data theft. However, if a computer is on a network, a computer hacker can get illegal access.*
- ***Rapid Spread of Computer Viruses**: If any computer system in a network gets infected by computer virus, there is a possible threat of other systems getting infected.*
- ***Expensive Set Up:** The initial set up cost of a computer network can be high depending on the number of computers to be connected.*
- ***Dependency on the Main File Server**: In case the main File Server of a computer network breaks down, the system becomes useless*
- ***Exposure to External Exploits.** Someone on a different computer can send data to the computer in such a way as to attack it - make it lock up or crash, make it slow down, or even take control of it.*
- ***Automatic Downloads**. If a computer is connected to a network, it's easier to download and install software from the network onto the computer without any human intervention. If the new software hasn't been tested, it could cause unpredictable behavior.*
- ***Computer Networks can fail.** Computer networks can be so powerful and useful that it is very vital for them to be used. All of the computers in an office building might become completely useless if a single network component fails*

Mention three types of physical transmission media.

- *Twisted wire,*
- *Coaxial cable,*
- *Fiber optic line*

Describe the following examples of wireless transmission media.

Microwave*:is high-frequency radio waves that are sent through the atmosphere and space to deliver telecommunications services, including TV distribution. It is dependent on line of sight.*

Satellite: *Is basically a microwave station placed in outer space. The satellite receives a signal from the earth, amplifies it, and then rebroadcasts it at a different frequency to any number of earth-based stations.*

Cellular radios.*This is a device that uses a receiver and a transmitter.*

Bluetooth: *This is wireless technology standard for exchanging data and information over short distances.*

How is analogue signal different from digital signal? Give one example for each of these signals.

An analog signal *uses variations which are represented by a continuous waveform to convey information. It is particularly useful for wave data like sound waves. Analog signals are what normal phone line and sound speakers use.* **While**

A digital signal *is a series of discrete (discontinuous) bits which are simply the presence or absence of an electric pulse. The state of being on or off represents the binary digit of 1 or 0, respectively*

Give the advantages of digital signals.

- *Digital signals can be copied exactly without any loss of quality*
- *Digital signals can be further processed by computer.*

What is the difference between Asynchronous transmission and Synchronous transmission of data?

Asynchronous transmission *transmits one byte at a time over a line at random intervals While*

Synchronous transmission *transmits groups of bytes simultaneously at regular intervals.*

Explain with examples the following data transmission channels/direction.

Simplex transmission *sends data in one direction only.Simplex transmission is used only when the sending device does not require a response from the receiving device. One example of simplex transmission is television broadcasting, radio station.*

Half-duplex transmission *allows data transmission in either direction, but only one way at a time. Many fax machines, police radio calls, credit card verification systems and automatic teller machines use half-duplex transmission.*

Full-duplex transmission, *data can flow in both directions at the same time. A regular telephone line, for example, supports full-duplex transmission, allowing both parties to talk at same time*

Multiplex transmission, *several different types of signals can be carried at once through the same line. E.g. During Video calls where Images are sent to one another.*

What is meant by Networking Hardware?

Networking hardware includes all computers, peripherals and Communications devices that enable two or more computers to exchange items such as data, instructions, and information with each other.

List the examples of networking hardware that you know?

- *Server computer*
- *Clients/work stations*
- *Network interface card,*
- *Modems,*
- *Hub/Switch,*
- *Repeater*
- *Router*
- *Multiplexer .*

Distinguish between a server and a dedicated server.

A server *is the host or central computer that manages the resources on a network.A server provides a centralized storage area for programs, data, and information. While*

A dedicated server *is a server that performs a specific task*

Mention examples of dedicated servers that you know?

- *File server,*
- *Print server,*
- *Database server*
- *Network server.*

Describe the roles of a dedicated server in a network.

- *A file server stores and manages files on a network*
- *A print server manages printers and print jobs.*
- *A database server stores and provides access to a database*
- *A network server (e.g., a DNS) manages network traffic.*

Discuss the requirements that a server must have in order to function properly.

- *It needs a computer with very high processing speed*
- *It needs large amounts of RAM*
- *It needs a very big storage capacity*
- *It needs a very fast Network interface card*
- *It needs network operating system such as Novell Netware, Windows NT Server or Apple Share.*

Describe the following networking hardware devices as used in Computer Networking

A network card, *also called network interface card (NIC), is a device that enables the computer or device that does not have built-in networking capability to access a network. Examples include; adapter card, PC Card, USB network adapter, flash card e.t.c.*

The modem *is a device which converts a digital signal from computers into an analog one to send data out over the phone line. Then for an incoming signal it converts, the analog signal into a digital one.*
Hubs and Switches*A hub, (also called a multi-station access unit (MAU)) is a device that provides a central point for cables in a network.Unlike the hubs, a switch does not broadcast the data to all the computers; it sends the data packets only to the destined computer.*

A repeater *is a device that accepts a signal from a transmission medium, amplifies it, and retransmits it over the medium. As a signal travels over a long distance, it undergoes a reduction in strength, an occurrence called attenuation.*
A Router *connects multiple networks and routs communications traffic to the appropriate network using the fastest available path. A router allows multiple computers to share a single high-speed Internet connection such as through a cable mode.*
A bridge *connects two pieces of land together offering a path from one to another. A network bridge is device that connects two networks making each accessible to the other. A bridge knows all of the addresses on each side of the bridge and can send information accordingly.*

A multiplexer *is a device that combines two or more input signals from various devices into a single stream of data and then transmits it over a single transmission medium. By combining the separate data streams into one, a multiplexer increases the efficiency of communications and reduces the need for using multiple separate transmission media.*

Mention the functions communication software as used in Networking.

- *Network control,*
- *Access control,*
- *Transmission control.*
- *Error detection/correction*
- *Network security*

What do the programs in communication software do?

- *Help users establish a connection to another computer or network;*
- *Manage the transmission of data, instructions, and information;*
- *Provide an interface for users to communicate with one another*

Define the term Networking Operating System.

A network operating system (NOS) is the system software that organizes and coordinates the activities on a network.

Mention the examples of Networking Operating Software.

- *Novell NetWare*
- *Microsoft Windows server 2003 and 2008.*
- *AppleShare*
- *Unix /NFS*
- *Sun Solaris.*

Explain the term Network Protocols?

This refers to a set of rules and procedures governing transmission between components in a computer network.

Suggest the role played by networking protocols as used in Networking.

- *Identifying each device in the communication path;*
- *Securing the attention of the other device;*
- *Verifying correct receipt of the transmitted message;*
- *Determining that a message requires retransmission if it is incomplete or has errors;*
- *Performing recovery when errors occur.*

Explain the following common protocols as used as in networking

Simple Mail Transfer Protocol (SMTP) *- an internet protocol for transferring of e-mails.*

File Transfer Protocol (FTP): *It allows files containing text, programs, graphics, numerical data, and so on to be downloaded off or uploaded onto a network.*

Internet Protocol (IP) *- does the packet forwarding and routing.*

Transmission Control Protocol/Internet Protocol (TCP/IP) *is a network standard that defines how messages (data) are routed from one end of a network to the other, ensuring the data arrives correctly.*

Transmission Control Protocol (TCP) *:responsible for delivery of data over the network.*

Hypertext Transfer Protocol (HTTP): *It allows Web browsers and servers to*

send and receive Web pages.

***Simple Network Management Protocol (SNMP)**: It allows the management of networked nodes to be managed from a single point.*

***Telnet Protocol**: It provides terminal emulation that allows a personal computer or workstation to act as a terminal, or access device, for a server.*

***Sequential Packet Exchange (IPX/SPX)**:works with the Novell's internet work' packet / sequential exchange; responsible for delivery of sequential data over the network*

Define the term Communication Application Software?

These are computer software programs that help to accomplish specific tasks related to telecommunications.

List the examples of Communication Application Software.

- *E-mail,*
- *FTP,*
- *Web browsers,*
- *Newsgroup/message boards,*
- *Chat rooms,*
- *Instant messaging,*
- *Video conferencing, and*
- *VoIP.*

Describe the term Network Topology?

A network topology is a description of the possible physical connections within a network. In other words, a topology is the physical arrangement of the devices in a communications network

Explain the following networking topologies as used in computer networking

***A bus or linear network topology** consists of a single central cable that connects all computers and devices together.The physical cable that connects the computers and other devices is known as the bus or the backbone.*

***Ring network** consists of a cable forming a closed ring, or loop, with all the computers and devices in a network. A ring network links all nodes together in a circular chain.*

***Star network,** all of the computers and devices (nodes) on the network connect to a central hub or switch. All data that is transferred from one computer to another passes through the hub.*

***Mesh Topology:** This is the type of network topology in which each of the nodes of the network is connected to each of the other nodes in the network.Fully*

connected Mesh topology makes it possible for data to be simultaneously transmitted from any single node to all of the other nodes.
***Tree network topology is** also known as the hierarchical network topology.This is because it contains different levels of hierarchy*

Give the advantages and disadvantages of each network topology named above.

Advantages of Bus Topology

- *Easy to implement and extend (quick setup)*
- *Cheaper than other topologies.*
- *Computers and devices can be attached and detached at any point on the bus without disturbing the rest of the network.*
- *Failure of one device usually does not affect the rest of the bus network.*
- *Data, instructions, and information in a bus network can be transmitted in both directions.*
- *Cable faults are easily identified.*
- *Weight reduction due to less wires*

Disadvantages of Bus Topology.

- *If there is a problem with the cable, the entire network goes down.*
- *There is no central host computer to control the network.*
- *Only one device can transfer items at a time.*
- *If many computers are attached, the amount of data flowing along the cable increases, data collisions occur and the network slows down.*
- *Limited cable length and number of stations.*
- *Performance degrades as additional computers are added or on heavy traffic.(shared bandwidth)*
- *It is slower than the other topologies.*

Advantages of Ring Topology.

- *Ring topology Can cover a larger distance as compared to a bus network and is commonly used in wide area networks (WAN)*
- *No collisions occur because data takes one direction only*
- *Very orderly network where every device has access to the token and the opportunity to transmit*
- *The speed of data transmission is faster than in a bus topology.*

Disadvantages of Ring Topology.

- *Ring Topology Network is More difficult to establish.*
- *If the cable fails, the whole network goes down.*

- *Data messages travel in only one direction from device to device around the entire ring*
- *If a node on a ring network fails, all nodes after the failed nodes cannot function.*
- *There is no central host computer to control the network.*
- *Moves, adds and changes of devices can affect the network .*

Advantages of Star Topology.

- *Easy to install and maintain.*
- *Better performance: The star topology prevents the passing of data packets through an excessive number of nodes.*
- *Computers and devices can be added to or removed from the network with little or no disruption to the network.*
- *Reliable because each device connects directly to the hub, if one device fails, only that device is affected.*

Disadvantages of Star Topology.

- *If the hub fails, the entire network fails*
- *Lots of cable required so that the installation cost is expensive.*
- *Network size is limited by the number of connections that can be made to the hub.*
- *Performance for the entire network depends on the capabilities of the hub.*
- *Set up of the system can be very complex*

Advantages of Mesh Topology.

- *Data will always be delivered.*
- *All of the data that is transmitted between nodes in the network takes the shortest path between nodes.*
- *In the case of a failure or break in one of the links, the data takes an alternate path to the destination.*

Disadvantages of Mesh Topology.

- *Mesh topology is generally too costly and complex for practical networks, and very hard to setup.*
- *Lots of cable required so that the installation cost is expensive.*
- *Network size is limited by the number of interconnections that can be made between the computers.*
- *It requires that the nodes of the network possess some type of logical 'routing' algorithm to determine the correct path to use at any particular time*

Discuss the factors to consider when choosing a network Topology.

- *Cost of the topology*

- *Future growth:*
- *Length of cable needed.*
- *Number of computers to be connected*
- *Level of security required.*

Describe the term a Local Area Network?

A local area network (LAN) *is a network that connects computers in a small geographic area such as a building like a computer laboratory, or an office.The nodes are connected to the LAN via cables.A wireless LAN (WLAN) is a LAN that does not use physical wires, but uses wireless media such as radio waves*

List the two types of Local Area Networks.

- *Peer-to-peer Network.*
- *Client-Server Network*

Describe the term Peer-to Peer Network?

This is a type of network where each computer can share the hardware, data, or information located on any other computer on the network. Each computer stores files on its own storage devices.Each computer on the network contains both the network operating system and application software.

Give the advantages of Peer-to Peer Network?

- *A peer-to-peer network is simple to setup i.e. does not require too much configuring*
- *It is not expensive to set up*
- *It does not require a dedicated server to control the network*
- *It is perfect for home and small business users.*

Mention two Disadvantages of a Peer to Peer Network.

- *The system is not centralized, making administration difficult .*
- *Lack of security i.e. files can be accessed by any one on the network.*

Explain the term Client-Server Network?

A client/server network has one or more computers acting as a server while the other computers (i.e., clients) on the network can request services from the server.

Distinguish between a Client-Computer and a Server.

A client computer** is a computer that can access the resources on a network.**While

***A server**is a computer that provides a centralized storage area for programs, data, and information.*

Give the advantages of Client-Server Network.

- *All Resources are centralized and easier to access.*

- *Easy management and administration of the network.*
- *More data security since all network access is controlled through the server.*
- *The network is flexible, because changes and new technology can be easily included into system.*
- *Client /Server network is faster than P2P since data and resources are handled by a dedicated machine*
- *It is to Backup all data stored centrally on the server.*
- *Client Server network can support many computers as compared to a P2P network*

Mention the disadvantages of a Client /Server Network.

- *It is expensive to set up as compared to a P2P network.*
- *It requires an extra computer to serve as a dedicated server.*
- *Maintenance – large networks will require an administrator staff to ensure efficient operation*
- *Dependence – When the server goes down, operations will cease across the network*
- *Server can get overloaded since all the processing is controlled at one point.*

Describe the term Personal Area Network?

A personal area network (PAN) is the interconnection of computer devices within the range of an individual person, typically within a range of 10 meters.

Differentiate between a Wide Area Network and Metropolitan Area Network.

A wide Area Network (WAN) *is a network that covers a large geographic area.An example of a WAN is a network that connects the district office computers of a company across the country or across several counties in the world.Computers are often connected to a WAN via public networks such as the telephone system or by dedicated lines or satellites.**While***
A metropolitan area network (MAN) *is a large computer network that usually spans a city or a large campus. A MAN usually interconnects two or more LANs using a high-capacity backbone technology, such as fiber-optical links or other digital media. A MAN covers a smaller geographic area than a WAN.*

Briefly describe the following terms.

Intranet *refers to a connection of private computer networks within an organization***.**
Extranet *is a computer network that allows controlled access from the outside for specific business or educational purposes. Extranets are extensions to, or segments of, private intranet networks that have been built in many corporations for information sharing.*

The internet *is a global connection of computer networks.The internet links together millions of computers, to exchange and share information all over the world.*

Discuss the benefits of installing an intranet in a school

- *Facilitates internal emails*
- *Provides access to company contacts information, procedure manual and other frequently updated documents.*
- *Used for posting and updating employee forms*
- *Posting internal job listings*
- *Provides electronic catalogs for ordering supplies*
- *Facilitates collaborative computing*
- *Scheduling meeting and appointments.*
- *Posting financial statements and other types of corporate information*
- *Maintains shared calendars, projects timelines and other project documents*
- *Provides access to company databases and other systems*
- *For monitoring internal security.*

What are the advantages and disadvantages of installing a school network?
Advantages of Installing a School Network

- ***Speed.*** *Networks provide a very rapid method for sharing and transferring files.*
- ***Cost.*** *Networkable versions of many popular software programs are available at considerable savings when compared to buying individually licensed copies.*
- ***Security.*** *Files and programs on a network can be safe i.e. passwords can be established for specific directories to restrict access to authorized users.*
- *Sharing resources such as laser printers, fax machines, modems, scanners, etc. is simplified.*
- ***Electronic Mail.*** *Electronic mail on a LAN can enable students to communicate with teachers and peers at their own school.*
- ***Flexible Access.*** *School networks allow students to access their files from computers throughout the school. Students can also work cooperatively through the network.*

Disadvantages of Installing a School Network

- ***Expensive to Install.*** *Although a network will generally save money over time, the initial costs of installation can be prohibitive.*
- ***Requires Administrative Time.*** *Proper maintenance of a network requires considerable time and expertise.*

- ***Must Monitor Security Issues.*** *Wireless networks are becoming increasingly common; however, security can be an issue with wireless networks*

Mention any two uses / applications of data communication.

- *Internet*
- *Downloading*
- *Uploading*
- *Video conferencing*

Write the following in full:

i) **RSS**-*Rich Site Summary/Really Simple Syndication*
ii) **RFID**-*Radio Frequency Identification*
iii) **FTP** -*File Transfer Protocol*
iv) **BBS -***Bulletin board service*
v) **TCP/IP -***Transmission Control Protocol/Internet Protocol*
vi) **OSI-** *OpenSystemsInterconnection*
vii) **ISDN-***IntegratedServiceDigitalNetwork*

Mention any two factors you will consider before establishing a network.

- *Cost of installation.*
- *Number of computers and other devices.*
- *Architecture of the building to be used.*
- *Purpose of the network.*
- *Distance of connectivity.*
- *Safety provisions of the network.*
- *Personnel provisions/technicalities involved.*
- *Ease in accessing the network/ speed on the network.*
- *Future growth of the organization and expansion of the network.*

Give two advantages of using a cable network.

- *It relatively cheap compared to wireless.*
- *It cannot be interfered or affected during transmission*
- *It is easy to maintain*
- *It is easy to install.*

Give one advantage of using a client - server model.

- *Provides for better security*
- *Easier to administer when the network is very large.*

Give two forms of wireless communication devices.

- *Broadcast radio.*

- *Cellular radio.*
- *Microwaves.*
- *Communications satellites.*
- *Infrared (IR).*
- *Wireless Fidelity(WIFI)*

School has bought computers for use in a laboratory. Mention two more requirements they need to:

(i). set up a computer network.

- *ISDN and DSL Modems*
- *Computer*
- *Network interface card*
- *Ethernet cables*
- *Routers*
- *Hubs .*
- *Multiplexer*
- *Switches*

(ii). set up internet.

- *Network Interface Card*
- *Internet service provider*
- *Internet browser*
- *Modems*

Describe the termFirewall?

Afirewall*isanetworkingdeviceorsoftwarethatisinstalledat the entranceto aLAN whenconnectingnetworkstogether,particularlywhenconnectingaprivatenetworkto apublicnetwork,suchasthe internetto providenecessaryprotectionfromnetwork crime.*

Statetwofunctionsoftheanetworkadministratorinanorganization.

- *Networkadministratorsareresponsibleforbuilding,maintaining,managing, andrepairinganorganization'scomputernetworks.*
- *Networkadministratorshandlea company'sLocalAreaNetworks(LANs), Wide AreaNetworks(WANs)andnetworksegments,aswellas managethe company's Internetandintranetsystems.*
- *Theymustinstallandmaintainhardwareandsoftwarethatsupportsanorganization'snetworks,makingsureeverythingisworkingthewayit is supposedto be.*
- *Networkadministratorskeepasharpeyeonnetworkperformance,takingsteps to ensureuser'sneedsarebeingmetandrepairinganyproblemsthatcropu*

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- *Networksecurityisalsoavitalcomponentofanetworkadministrator'sw ork,as theymustestablisha meansofprotectingthe organization'snetworksfrom hackersandotherthreats.*

Mention one danger of using wireless communication in an organisation.

- *Network security is a challenge to many organizations.*
- *There is a lot of interference by obstacles like trees, e.t.c.*
- *Inconsistent connections.*
- *Wireless communication becomes slower when the user goes away from the hotspot.*

Why are majority of organisations still using cable networks

- *They are cheap to use and trunk.*
- *Signals are still strong even for a longer distance.*
- *Some computers are still using network interface cards that support cables only.*
- *Some computers have already established a cable network.*
- *Some organisations are still having network administrators who still feel that cables are still useful for data communication.*

What is a network protocol?

This is a set of rules that governs communication between computers on a network.

Mention one example of a half-duplex communication device.

- *Police radio calls*
- *Telephone*
- *Walk talkie*
- *Marine radio calls*

State two precautions needed before setting up a wireless network.

- *The cost of maintenance*
- *The user-friendly to users*
- *The number of users*
- *The location to be covered*

Statetwoexamplesofphysicalnetworktopologiesthatcanbe setinalab.

- *Ringtopologies*
- *Bus topologies*

- *Star topologies*
- *Meshtopologies*
- *Treetopologies*

Statetwofactorsyouconsiderbeforesettingupacomputer network.

- *Costof installation.*
- *Numberofcomputersandotherdevices.*
- *Architectureof the buildingto be used.*
- *Purposeof the network.*
- *Distanceofconnectivity.*
- *Safetyprovisionsof the network*
- *Personnelprovisions/technicalitiesinvolved.*
- *Easein accessingthe network/speedon the network.*
- *Futuregrowthof the organizationandexpansionof the network*

Describe the following terms as used in data communication

a) **Communication***is the exchange of information between devices. It also refers to the process of sending and receiving information through a communication channel/path.*

b) **A network** *is an interconnection of computers and network devices to enable communication and resource sharing.*

c) **A protocol***is a set rules/standards/regulations governing/guiding communication over a network.*

d) **A modem***is a device that translates analog signals to digital signals and from digital to analog. A combined device for modulation and demodulation*

(e) **A bandwidth***is the amount of data that can be transmitted at a time. It also refers to the rate of data transmission. It refers to the range of frequencies in a given transmission medium. It is a maximum throughput of a transmission medium.*

Using the following words, fill in the spaced provided for (a) to (e) below. Videoconferencing, RSS feed, GPS, webcam, spreadsheets, video, simplex channel.

(a). ***GPS*** can be used to locate objects in a given region.
(b). ***Simplex Channel*** is a single directional communication method.
(c). Multimedia is largely made up of a ***video.***
(d). instant breaking news on a website can easily be accessed using a /an ***RSS***
(e). Live and video instant communication using a website is referred to as ***video conferencing*** and with it, a ***webcam*** is used to capture images for uploading.

State one advantages of using a network by an organization.

- *User information is easily monitored to ensure privacy while using a network.*
- *Computers allow users to create and manipulate information. Information takes on a life of its own on a network.*
- *The network provides both a place to store the information and means to share that information with other network users.*

- *Administrators, instructors, students and guests can be connected using the campus network. This makes communication easy amongst users.*
- *An organisation can provide services, such as registration, school directories, course schedules, access to research, and email accounts, and many others.*
- *The school can provide network users with access to the internet, via an internet gateway.*
- *The school can provide access to special purpose computing devices which individual users would not normally own. For example, a school network might have high-speed high quality printers strategically located around a campus for instructor or student use.*
- *Computer networks enable people to access their information from connected devices throughout the organisation. Students can begin an assignment in their classroom, save part of it on a public access area of the network, then go to the media center after school to finish their work. Students can also work co-operatively through the network.*
- *Collaborative software allows many users to work on a document or project concurrently. For example, educators located at various schools within a county could simultaneously contribute their ideas about new curriculum standards to the same document, spreadsheets, or website.*
- *Computer peripheral devices can be shared e.g. printers, storage space, e.t.c.*

Describe briefly the functions of a modem for transmitting data between two computers through a standard telephone line.

- *The modem of the sending computer converts digital signals into analog*

signals so that the signals can be transmitted through the telephone line.

- *The modem of the receiving computer converts analog signals picked up from*

the telephone line back into digital signals so that the signals can be understood by the computer

What is modulation and demodulation?

***Modulation** is the process of converting digital signals into analog signals, while**demodulation** is the process of converting analog signals into digital signals.*

Give the advantages of using a computer fax modem over using a stand-alone
fax machines.

- *Allows a user to store received faxes on the computer.*
- *Received faxes can be e-mailed to others.*

What is a communication protocol? Which protocol is used as the Internet
communication standard?
A communications protocol is a set of rules and procedures for exchanging information among computers on a network.
The TCP/IP (Transmission control protocol/Internet protocol) is a set of protocols widely used on the Internet.

Describe briefly how TCP/IP works.
TCP/IP manages the transmission of data by breaking it up into packets. It then provides routing information for sending the packets along the fastest available path to the recipient's computer, and then reassembles the data at the
receiving end.

What is Ethernet? State two advantages of using Ethernet for networking.
Ethernet is a LAN protocol that allows personal computers to contend for access to the network.
Advantages of Ethernet:
- *Easy to install and maintain.*
- *Inexpensive.*

How is a dial-up line different from a leased line?
***A dial-up line** is a temporary connection that uses one or more analog telephone lines for communications. While*
***A leased line** is a dedicated line leased from a telephone or communications service company.*

Give four examples of information that can be obtained from the Internet.
- *News*
- *Sports results*
- *Stock prices*
- *Weather reports.*

State four reasons why people want to access the Internet.
- *To search for different kinds of information.*
- *To shop for goods and services.*

- *Listen to music and watch movies.*
- *Communicate with other people.*

Describe briefly the meaning of IP address and domain name, and how they are related.

An IP (Internet protocol) address is a number that uniquely identifies each computer or device connected to the Internet.
A domain name (e.g., www.csklsc.net) is the text version of an IP address (e.g., 216.200.47.93).