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(1) Define Analog signal.

Ans: **Analogue data** is represented in a continuous form. Data is sent using variable currents in an analogue system, it is very difficult to remove noise and wave distortion. Analogue signals cannot perform high-quality data transmission.

(2) Why do we require a twist in a twisted pair cable?

Ans: The twisted cable pair are twisted to cancel the effect of external magnetic field. Which can destroy the signal the twists cancels that effect Twisted pair is the ordinary copper wire that connects home to reduce cross talk or electromagnetiinduction between pair of wires.

(3) Which class of IP address is used for multicast communication?

Ans: The IP address that defines a multicast group is a **Class D** address (224.0. 0.0 to 239.255. 255.255). Multicast addresses cannot be used as source addresses for any traffic.

(4) Explain the significance of hardware-software protocols.

Ans: The **protocol** defines the rules, syntax, semantics and synchronization of communication and possible error recovery methods. **Protocols** may be implemented by **hardware**, **software**, or a combination of both.To reach an agreement, a **protocol** may be developed into a technical standard.

(5) Why do we require network security?

Ans: A good **network security** system helps business reduce the risk of falling victim of data theft and sabotage. **Network security** helps protect your workstations from harmful spyware. It also ensures that shared data **is** kept **secure**.

(6) What is the use of Application layer in OSI Model?

Ans: An **application layer** is an abstraction **layer** that specifies the shared communications protocols and interface methods **used** by hosts in a communications network. The **application layer** abstraction is **used** in both of the standard **models** of computer networking: the Internet Protocol Suite (TCP/IP) and the **OSI model**.

(7) Explain broadcast network with examples.

Ans: Broadcast network have a single communication channel that is shared or used by all the machines on the network. short message called packed send by any machine are received by all others.

(8) Define Transmission Media with the help of classification diagram.

Ans: Transmission media is a communication channel that carries the information from the sender to the receiver. Data is transmitted through the electromagnetic signals.
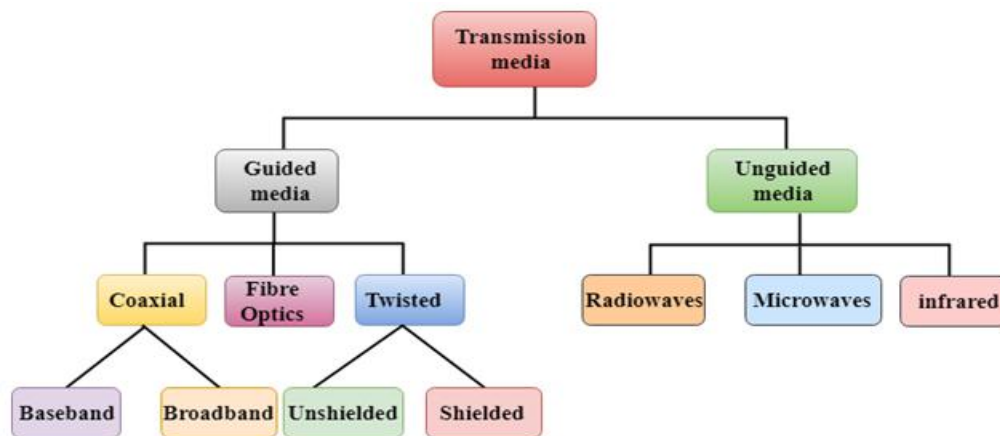
(9) Explain subnet mask.

Ans:

(10)Give uses of Hub and Gateway.(I.M.P.)

Ans: A **hub** is a physical layer networking device which is used to connect multiple devices in a network. They are generally used to connect computers in a LAN. A **hub** has many ports in it. A computer which intends to be connected to the network is plugged in to one of these ports.

Thanks to **gateways**, we are able to communicate and send data back and forth. The Internet wouldn't be any use to us without **gateways.**

(11)What do you mean by broadcast and multicast?(I.M.P.)

Ans: Broadcast system generally use a special code in the address field for addressing a packet to all the concerned computers. This mode of operation is called broadcasting.

 Some broadcast system also support transmission to a subset of the machines known as multicasting

(12)What is Cipertext?(M.I.M.P.)

Ans: Cipher is an algorithm which is applied to plain text to get ciphertext. It is the unreadable output of an encryption algorithm. The term "cipher" is sometimes used as an alternative term for ciphertext. Ciphertext is not understandable until it has been converted into plain text using a key.

(13)Explain the concept of Peer to Peer Architecture.

Ans: It has no dedicated server in a data center. The peers are the computers which are not owned by the service provider. Most of the peers reside in the homes, offices,

schools, and universities. The peers communicate with each other without passing the information through a dedicated server, this architecture is known as peer-to-peer architecture. The applications based on P2P architecture includes file sharing and internet telephony

(14)Explain the terms: Frequency and Nyquist Ratio.

Ans: Frequency is the relationship of a signal to time and that the frequency of a **wave is the number of cycles it completes in 1 sec**. But another way to look at frequency is as a measurement of the rate of change. If the value of a signal changes over a very **short span of time, its frequency is high**. If it changes over a **long span of time, its frequency is low.**

For a noiseless channel, the Nyquist bit rate formula defines the theoretical maximum bit rate , **BitRate = 2 x bandwidth x 10g2 *L***In this formula, bandwidth is the bandwidth of the channel, *L* is the number of signal levels used to represent data, and BitRate is the bit rate in bits per second.

(15)Explain Guided Communication Media. List any three examples.

Ans: It is defined as the physical medium through which the signals are transmitted. It is also known as Bounded media. **examples** of **guided media** include phone lines, twisted pair cables, coaxial cables, and optical fibers.

(16)Explain Token Passing Mechanism in Ring Topology.

Ans: A token moves around the network, and it is passed from computer to computer until it reaches the destination. The sender modifies the token by putting the address along with the data. The data is passed from one device to another device until the destination address matches. Once the token received by the destination device, then it sends the acknowledgment to the sender. In a ring topology, a token is used as a carrier.

(17)Write the differences between Repeater and Hub.

Ans: **Repeater** has two ports: one for incoming signal and another one for "boosted" outgoing signal. **Hub** is able to join more than two signals. It takes the signal, "boosts" it, and transmits to all its ports. Typically **hub** can connect from 8 to 24 connections together.

(18)What is Network Topology? Give the list of Network Topology.

Ans: **Network topology** is the way a **network** is arranged, including the physical or logical description of how links and nodes are set up to relate to each other.

1. Bus Topology
2. Ring Topology
3. Tree Topology
4. Star Topology
5. Mesh Topology
6. Hybrid Topology

(19)   One of the advantages of Computer Network is high reliability. Explain it.

Ans: Computer network can use the alternative source for the data communication in case of any hardware failure. OR a **reliable** protocol is a communication protocol that notifies the sender whether or not the delivery of data to intended recipients was successful.

(20)How Switch differs from Hub?

Ans:

Sr. No.	Key	Hub	Switch
1	Objective	Hub main objective is to transmit the signal to port to respond where the signal was received.	Switch enables connection setting and terminating based on need.
2	Layer	Hub works in Physical Layer.	Switch works in Data Link Layer.
3	Transmission Type	Hub uses broadcast type transmission.	Switch uses unicast, multicast as well as broadcast type transmision.
4	Ports	Hub can have maximum 4 ports.	Switch can have 24 to 28 ports.
5	Collision Domain	Hub has a single collision domain.	In Switch, each port have their own collision domain.
6	Packet Filtering	Hub do not provide packet filtering.	Switch provides packet filtering.
7	Transmission Mode	Hub uses half duplex transmission mode.	Switch uses full duplex transmission mode.

(21)What is the relation between Data rate and Bandwidth?

Ans:

BANDWIDTH	DATA RATE
It is the potential of the data that is to be transferred in a specific period of time.	It is the amount of data transmitted during a specified time period over a network.
It is the number of bits per second that a link can send or receive.	It is the speed of data transmission.
Normally it is measured in bps, Mbps or Gbps.	It is normally measured in Mbps or MBps.
It refers to to maximum data transmission speed.	It refers to the actual data transmission speed.
It is physical layer property in OSI model.	While it is common in all layers.
It shows the capacity of the channel.	It shows the present speed of data transmission.
It does not depend on properties of sender or receiver.	While it gets affected by sender or receiver.

(22) What is the purpose of Public and Private Key?

Ans: Unlike symmetric **key** algorithms that rely on one **key** to both encrypt and decrypt, each **key** performs a unique **function**. The **public key** is used to encrypt and the **private key** is used to decrypt.

Private Key is used to both encrypt and decrypt the data and is shared between the sender and receiver of encrypted data. The public **key** is only used to encrypt data and to decrypt the data, the **private key** is used and is shared. The **private key** mechanism is faster.

(23) Twisted pair cables are twisted in a helical form, what purpose it serves. Explain with the aid of diagram.

Ans:

(24) Define Bandwidth, Transmission rate.

Ans: The bandwidth of a composite signal is the difference between the highest and the lowest frequencies contained in that signal. (Bandwidth describes **the maximum amount of data transfer rate of a network or Internet connection.)**

Propagation **speed** is the amount of time it takes for one particular signal to get from one point to another. **Transmission Rate** is the total amount of data that can be sent from one place to another in a given period of time. Consider two possibilities at (or close to) opposite extremes: A 300 baud modem.

(25)List the protocols used in network and transport layer.

Ans: there are many protocols are as follow:

HTTP, HTTPS, FTP, TFTP, Telnet, SSH, SMTP, SNMP, NTP, DNS, DHCP, NFS, X Window, LPD.

The **two protocols** used in the transport layer are **User Datagram protocol (UDP)** and **Transmission control protocol (TCP).**

(26)Explain NTFS feature of Windows NT operating system.

Ans: NT file system (NTFS), which is also sometimes called the New Technology File System, is a process that the Windows NT operating system uses for storing, organizing, and finding files on a hard disk efficiently. Performance: NTFS allows file compression so your organization can enjoy increased storage space on a disk.

(27)Define block cipher.

Ans: A **block cipher** is an **encryption** method that applies a deterministic algorithm along with a symmetric key to encrypt a **block** of text, rather than encrypting one bit at a time as in **stream ciphers**. For example, a common **block cipher**, **AES**, encrypts 128 bit **blocks** with a key of predetermined length: 128, 192, or 256 bits.

(28)Give advantages and disadvantages of mesh topology.

 Ans:
 Advantages of Mesh topology:

 Reliable: The mesh topology networks are very reliable as if any link breakdown will not affect the communication between connected computers.

 Fast Communication: Communication is very fast between the nodes.

 Easier Reconfiguration: Adding new devices would not disrupt the communication between other devices.

 Disadvantages of Mesh topology:

 Cost: A mesh topology contains a large number of connected devices such as a router and more transmission media than other topologies.

 Management: Mesh topology networks are very large and very difficult to maintain and manage. If the network is not monitored carefully, then the communication link failure goes undetected.

 Efficiency: In this topology, redundant connections are high that reduces the efficiency of the network.

(29)Define network protocol.

Ans: A **network protocol** is an established set of rules that determine how data is transmitted between different devices in the same **network**. Essentially, it allows connected devices to communicate with each other, regardless of any differences in their internal processes, structure or design.

(30)Differentiate between guided media and unguided media.

Ans:

Basis	Guided/ Bounded Media	UnGuided/ UnBounded Media
Transmission	Guided is wired transmission, in which data signals are guided along a physical path i.e. within a wire	Unguided/ Unbounded communication is wireless transmission. To exchange bits of data for laptop, notebook, smart watch, without wires, you need wireless communication.
Also, called?	Guided transmission is also known as Bounded Transmission Media.	UnGuided transmission is also known as UnBounded Transmission Media.
Media Types	Some well-known Guided Transmission media includes Twisted Pair Cable, Coaxial cable, fiber optic cable, etc.	UnGuided Transmission media includes Microwave Transmission, Satellite Communication, etc.
Media	The media can be seen and touched i.e. tangible.	The media is wireless and cannot be seen and touched i.e. intangible.
Distance	Used for shorter distance.	Used for larger distance.
Penetration	Guided Media cannot penetrate through the buildings	UnGuided Media can penetrate through the buildings.

(31)Briefly explain client operating system.

Ans: The **Client Operating System** is the **system** that works within **computer** desktops and various portable devices. This **system** is different from centralized servers because it only supports a single user. Smartphones and small **computer** devices are able to support **client operating systems**.

(32)Define Nyquist bit rate.

Ans: For a noiseless channel, the Nyquist bit rate formula defines the theoretical maximum bit rate **BitRate = 2 x bandwidth x 10g2 L**In this formula, bandwidth is the bandwidth of the channel, L is the number of signal levels used to represent data, and BitRate is the bit rate in bits per second.

(33)Write about the concept of client and server.

Ans: A **client** is a program that runs on the local machine requesting service from the server. A **client** program is a finite program means that the service started by the user and terminates when the service is completed.

A **server** is a **computer** that provides data to other **computers**. It may serve data to systems on a local area **network** (LAN) or a wide area **network** (WAN) over the Internet. Many types of **servers** exist, including web **servers**, mail **servers**, and file **servers**. Each type runs software specific to the purpose of the **server**

(34)Define the term Cryptography.

Ans: The traditional **cryptography** method uses encryption keys, which are long bit strings, usually consists of 128 bits or more. These keys are symmetric, public, or private. These are an essential part of any **cryptosystem**, for example, Public Key Infrastructure (PKI).

(35)What are the difference between Hub and Switch?

Ans:

PARAMETER	HUB	SWITCH
LAYER	Physical layer. Hubs are classified as Layer 1 devices per the OSI model.	Data Link Layer. Network switches operate at Layer 2 of the OSI model.
PORTS	4/12 ports	Switch is multi port Bridge. 24/48 ports
DEVICE TYPE	Passive Device (Without Software)	Active Device (With Software) & Networking device
TRANSMISSION TYPE	Hubs always perform frame flooding; may be unicast, multicast or broadcast.	First broadcast; then unicast & multicast as needed.
TABLE	A network hub cannot learn or store MAC address.	A network switch stores MAC addresses in a lookup table.
DATA TRANSMISSION FORM	Electrical signal or bits	Frame (L2 Switch) Frame & Packet (L3 switch)
TRANMISSION MODE	Half duplex	Full duplex
FUNCTION	To connect a network of personal computers together, they can be joined through a central hub.	Allow to connect multiple device and port can be manage, Vlan can create security also can apply
BROADCAST DOMAIN	Hub has one Broadcast Domain.	Switch has one broadcast domain [unless VLAN implemented]
DEFINITION	An electronic device that connects many network device together so that devices can exchange data	A network switch is a computer networking device that is used to connect many devices together on a computer network. A switch is considered more advanced than a hub because a switch will on send message to device that needs or request it.
COLLISIONS	Collisions occur commonly in setups using hubs.	No collisions occur in a full-duplex switch.
SPANNING TREE	No Spanning-Tree	Many Spanning-tree Possible

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(36)Define broadcast and multicast.

Ans: Broadcast system generally use a special code in the address field for addressing a packet to all the concerned computers. This mode of operation is called broadcasting. Some broadcast system also support transmission to a subset of the machines known as multicasting.

(37)What is Flow control?

Ans: If the rate at which the data are absorbed by the receiver is less than the rate at which data are produced in the sender, the data link layer imposes a flow control mechanism to avoid overwhelming the receiver.

(38)Explain the use of Private Key.

Ans: A **private key**, also known as a **secret key**, is a variable in cryptography that is **used** with an algorithm to encrypt and decrypt code. **Secret keys** are only shared with the **key's** generator, making it highly secure. **Private keys** play an important role in symmetric cryptography, asymmetric cryptography and cryptocurrencies.

(39)Differentiate between Active Hub and Passive Hub.

Ans: **Active Hub :-** These are the hubs which have **their own power supply and can clean , boost and relay the signal along the network.** It **serves both as a repeater as well as wiring centre**. These are used to **extend maximum distance between nodes**.

Passive Hub :- These are the hubs which **collect wiring from nodes and power supply from active hub**. These **hubs relay signals onto the network without cleaning and boosting them and can't be used to extend distance between nodes**.

(40)Differentiate between star topology and bus topology

Ans:

Bus Topology	Star Topology
All the nodes are connected in a linear bus.	All the nodes are connected to each other individually.
Slower as compared to star topologies of network.	Expensive as compared to Bus topology.
Breakage of wire at any point disturbs the entire network.	Long wire length.

(41)Define dedicated Servers.

Ans: These are assigned to provide specific application or services for the network, and nothing else . Because a dedicated server is specializing in only a few task , it require fewer resources from the computer that is hosting it.

(42)What do you mean by encryption and decryption?

Ans: **Encryption** is the process of converting data to an unrecognizable or "**encrypted**" form. It is commonly used to protect sensitive information so that only authorized

parties **can** view it. This includes files and storage devices, as well as data transferred over wireless **networks** and the Internet.

The conversion of encrypted data into its original form is called **Decryption**. It is generally a reverse process of encryption. It decodes the encrypted information so that an authorized user **can** only **decrypt** the data because **decryption** requires a secret key or password.

(43)Explain BitRate.

Ans: **Bitrate**, as the name implies, describes the rate at which bits are transferred from one location to another. In other words, it measures how much data is transmitted in a given amount of time. **Bitrate** is commonly measured in bits per second (bps), kilobits per second (Kbps), or megabits per second (Mbps).

(44)Differentiate between star & ring topology.

Ans:

STAR VERSUS RING TOPOLOGY

2 KEY DIFFERENCES

STAR TOPOLOGY	RING TOPOLOGY
Star topology is a network arrangement that connects all the devices to a central device such as a switch or hub that forms a pathway similar to a star to transmit data.	Ring topology is a network arrangement that connects every device to exactly two devices to form a single continuous pathway similar to a ring to send data.
Data from all devices travel through the central device	Data travel either in clockwise or anticlockwise direction along the ring till it arrives the destination
Visit www.differencebetween.com	Click here to go to main differences

(45)Explain Baud rate, Bandwidth.

Ans: The **baud rate** is the **rate** at which information is transferred in a communication channel. In the **serial** port context, "9600 **baud**" means that the **serial** port is capable of transferring a maximum of 9600 bits per second.

The bandwidth of a composite signal is the difference between the highest and the lowest frequencies contained in that signal. (Bandwidth describes **the maximum amount of data transfer rate of a network or Internet connection.)**

(46)Define analog and digital signals.

Ans: An **analog** or **analogue signal** is any continuous **signal** for which the time varying feature (variable) of the **signal** is a representation of some other time varying quantity, i.e., analogous to another time varying **signal**. It differs from a digital **signal in** terms of small fluctuations in the **signal** which are meaningful.

A **digital signal** is a **signal** that is being used to represent data as a sequence of discrete values; at any given time it can only take on, at most, one of a finite number of values.

(47)What is on-line storage, offline storage and near-line storage?

Ans: Online storage consists , most notable , of hard drive storage. Information stored on a hard drive can called up very quickly. For this reason ,hard drives are used to store files that are accessed regularly.

Offline Storage device include media such as data tapes and removable optical disks. This type of storage offers a high –capacity , low price alternative to online storage .

Near – line storage devices offer fairly low costs and high storage capacities , without requiring the network administrator to wake up , go to the archive shelf, and mount the tape or disk on the server

(48)What are advantage and disadvantage of Bus topology?

Ans: Advantages of Bus topology:

Low-cost cable: In bus topology, nodes are directly connected to the cable without passing through a hub. Therefore, the initial cost of installation is low.

Moderate data speeds: Coaxial or twisted pair cables are mainly used in bus-based networks that support upto 10 Mbps.

Familiar technology: Bus topology is a familiar technology as the installation and troubleshooting techniques are well known, and hardware components are easily available.

Limited failure: A failure in one node will not have any effect on other nodes.

Disadvantages of Bus topology:

Extensive cabling: A bus topology is quite simpler, but still it requires a lot of cabling.

Difficult troubleshooting: It requires specialized test equipment to determine the cable faults. If any fault occurs in the cable, then it would disrupt the communication for all the nodes.

Signal interference: If two nodes send the messages simultaneously, then the signals of both the nodes collide with each other.

Reconfiguration difficult: Adding new devices to the network would slow down the network.

Attenuation: Attenuation is a loss of signal leads to communication issues. Repeaters are used to regenerate the signal.

(49)What is the function of SMTP and HTTP?

Ans: Simple Mail Transfer Protocol. It is a communication protocol for electronic mail transmission.

Hyper Text Transfer Protocol. It is an application layer protocol for distributed, collaborative, hypermedia information systems.

(50)Differentiate between baseband and broadband transmission.

Ans:

BASEBAND VERSUS BROADBAND TRANSMISSION
2 KEY DIFFERENCES

BASEBAND TRANSMISSION	BROADBAND TRANSMISSION
Baseband Transmission is a transmission technique that one signal requires the entire bandwidth of the channel to send data.	Broadband Transmission is a transmission technique that many signals with multiple frequencies transmit data through a single channel simultaneously.
Baseband Transmission uses digital signals.	Broadband Transmission uses analog signals.
Visit www.differencebetween.com	Click here to go to main differences