CCA- 102: Data Communications

ASSIGNMENT 2

1. What are the different types of networks?
   The different types of networks are:
   1. Local Area Network (LAN) – A LAN refers to a group of computers in a localized area such as an office, school, laboratory, and home. It is generally confined to a building or a group of buildings. LAN is used as one type of transmission medium for sharing resources like files, printers, games and other application. It is a network which consists of less than 5000 interconnected devices across several buildings. Since it is a private network, an outside regulatory body never controls it. It operates at a relatively higher speed than any other WAN systems.
   2. Wide Area Network (WAN) – WAN spread across a large geographical area. They are used to link computers across the globe. A WAN can also connect individual LANS to create one integrated huge LAN. Majority of the WANs use satellites to facilitate efficient communication. High speed WANs link remote computers effectively to reduce costs and to complete work faster. Any organization can form its global integrated network using WAN.
   3. Metropolitan Area network (MAN) – MAN consists of computer network across an entire city or the metropolitan city, college campus or a small region. This type of network is larger than LAN which is mostly limited to only a single building or site.

   Other types of Computer Networks are WLAN (Wireless Local Area Network), SAN (Storage Area Network), VPN (Virtual private network), and EPN (Enterprise private network).

2. Explain the Shielded twisted pair (STP) and unshielded twisted pair (UTP).

   Shielded twisted pair (STP) cable was originally designed by IBM for token ring networks that include two individual wires covered with a foil shielding, which prevents electromagnetic interference thereby supporting data faster. This double wrapping helps shield the cable signals from interference. They are more expensive in nature but they support higher transmission rates across longer distance.

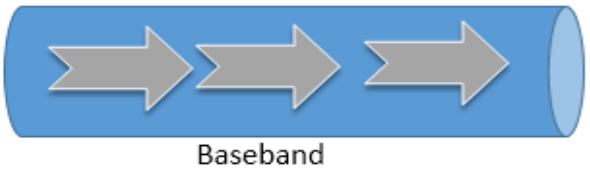
   Unshielded twisted pair (UTP) cable is widely used in computer and telecommunications industry as Ethernet cables and telephone wires. They are less expensive than STP. The twisted cable pairs work to cancel out electromagnetic interference from external sources such as electromagnetic radiation, ground water, pressure, root systems and more and it also cuts down on crosstalk.

3. What is the difference between baseband and broadband transmission?

Baseband	Broadband
It refers to a communication channel in which information is carried in digital form.	The signals are modulated as radiofrequency analog waves that use different frequency ranges.
Communication is bi-directional which means the same channel is used to transmit and receive	Communication is unidirectional, meaning two different channels are needed in order

signals.	to send and receive signals.
Every device n a baseband system shares the same channel.	Multiple independent channels can carry analog or digital information through FDM.
Baseband LANs are inexpensive and easier to install and maintain.	Broadband systems are generally expensive because of the additional hardware involved.
Baseband LANs have a limited distance reach which is no more than a couple miles.	Broadband LANs span much longer distance than baseband up to tens of kilometers.

The following is a diagram of Baseband and Broadband transmission.



Baseband

Broadband

4. What is the difference between a hub, modem, router and a switch?

A Hub, modem, router and a Switch are certain physical devices used to connect a computer to an internet connection.

Hub	Modem	Router	Switch
It is a connecting device that connects multiple computer networking devices together. It can be used both digital and analog data, provided its settings have been configured to prepare for the formatting of the incoming data. It acts as a repeater in that it amplifies signals that deteriorate after travelling long distances over connecting devices. Least intelligent, expensive and complex.	A connecting device that stores information in the form of digital signals whereas information is transmitted over telephone lines as analog signals. A modem is required to convert the digital signal of the computer to analog signal understood by the telephone lines to transmit the data over the internet.	It is a connecting device that connects together two or more networks. It is used to join a home or a business network to the internet. Routers are intelligent, smart and complex devices and they store information about the networks they are connected to.	Switch connects two or more LAN devices. It is a multiport device that improves network efficiency over hubs and routers because of the virtual circuit capability. The Switch maintains limited routing information about nodes in the internal network, and it allows connections to systems like hubs and routers. Generally, switches can read the hardware addresses of incoming packets to transmit them to the appropriate destination.

5. When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well?

   When we move the NIC cards from one PC to another PC, the MAC address also gets transferred as well because MAC addresses are hard-wired into the NIC circuitry, not the PC. This also means that a PC can have a different MAC address when another one replaced the NIC card.

6. When troubleshooting computer network problems, what common hardware-related problems can occur?

   A large percentage of a network is made up of hardware. Problems in these areas can range from malfunctioning hard drives, broken NICs, and even hardware startups. Incorrect hardware configuration is also one of main problems to be looked into.

7. In a network that contains two servers and twenty workstations, where is the best place to install an Anti-Virus program?

   The best place to install an Anti-Virus program when using a network that contains two servers and twenty workstations is on all servers and workstations to ensure protection because individual users can access any workstation and introduce a computer virus when plugging in their removable hard drives or flash drives.

8. Define Static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.

   Static IP address is an IP address that doesn't change but remains the same and changes only when internet architecture changes.

   A dynamic IP address is an IP address that can change and is temporary. It is assigned to a computing device or node when it's connected to a network.

   The difference between IPV4 and IPV6 are:

IPV4	**IPV6**
IPV4 addresses are 32 bit length.	IPV6 addresses are 128 bit length.
They are binary numbers represented in decimals.	They are binary numbers represented in hexadecimals.
Fragmentation is done by sender and forwarding routers.	Fragmentation is done only by sender.
No packet flow identification.	Packet flow is available using the flow label field.
Options field are available	No options available.
Configured either manually or through DHCP.	Does not require manual configuration or DHCP.
IPsec is not compulsory.	IPsec is compulsory.

9. Discuss TCP/IP model in detail.

   TCP/IP means Transmission Control Protocol/Internet Protocol. It is the protocol or set of rules by computers connected over the internet.it is designed to make data exchange possible on different types of computer networks, also known as a heterogeneous network. It has four layers and is more reliable. It does not have very strict boundaries, follow a horizontal approach. TCP/IP model network layer only provides connection less service and uses both session and presentation layer in the application layer itself. Protocols cannot be replaced easily in TCP/IP model.

   The four layers of TCP/IP model are:-

   1. Application layer.
   2. Transport Layer.
   3. Internet Layer.

4. Network Access Layer.

10. What is a Web Browser (Browser)? Give some examples of Browsers.

    A Web Browser (Browser) is a special software used to display web pages.

    Some examples of Web Browser commonly used are Google Chrome, Mozilla Firefox, Internet Explorer, Opera and Safari.

11. What is a Search engine? Give example.

    A software programme that searches and identifies data corresponding to the keyboard provided. When we want to look up some information or documents on the internet, we use a programme and enter our requirement using specified keywords in a search box. The programme then returns a list of websites that have the information that we needed.

    Some examples are Google, Yahoo, etc.

12. What is the internet and WWW? What are the uses of internet in our daily life?

    The Internet is a huge network comprising of many computer networks around the world run by companies, governments, universities and other organizations to talk to one another. The result is a mass of cables, computers, data centers, routers, servers, repeaters, satellites and Wi-Fi towers that allows digital information to travel around the world.

    WWW means World Wide Web which is also known as a Web, is a collection of websites or web pages stored in web servers and connected to local computers through the internet. These websites contain text pages, digital images, audios, videos, etc. Users can access the content of these sites from any part of the world over the internet using their devices such as computers, laptops, cell phones, etc. The WWW, along with internet, enables the retrieval and display of text and media to your device.

    The Internet has become a necessity of modern life. We can't imagine our life without Wi-Fi. The Internet has revolutionized the way we communicate and interact by linking computer networks through the Internet protocol suite (TCP/IP). This global network of interconnected computers has made communicating easier than before. It has also given us access to all kinds of information. The Internet has made life much easier through online shopping, sending of mail to any location across the world, online communications with many people, audio-video conferencing between multiple people, online financial services, e-learning courses anytime and everywhere.

13. What is an Internet Service Provider? Give some examples of ISP in India.

    Internet Service Provider is a company that provides access to the Internet by charging a monthly fee. In the modern day of computing, ISP provides an internet connection with different technologies. Some of them are BSNL, Reliance Jio, Airtel India, Vodafone, Bharti Enterprise and Spectranet.

14. Discuss the difference between MAC address, IP address and Port address.

MAC address	**IP Address**	**Port Address**
Unique identifier assigned to a Network Interface Controller (NIC) of the computing device,	A numerical label assigned to each device connected to a computer network that uses internet protocol for communications.	A numerical value assigned to an application as an address to receive and send data.
Stands for media Access control Address.	Stands for Internet protocol Address.	
Also called physical hardware or Ethernet address.	Also called logical address network or internet address.	
Cannot be changed.	Can be changed.	

48 bits long.	IPV4- 32 bits IPV6- 128 bits	16 bits
Works in the Data link layer.	Works in Network Layer.	Works in Transport Layer.

15. How do we view my Internet browser's history?

    To view my Internet Browser's history,

    Go to settings and select history or we can use the keyboard shortcut, Ctrl+H.