

CCA-102: DATA COMMUNICATIONS (ASSIGNMENT)

Q1. What are the different types of networks?

Ans: → Depending upon the geographical area covered by a network, it can be classified as under:

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

Q2. Explain the Shielded Twisted Pair (STP) and Unshielded Twisted Pair (UTP).

Ans: → Shielded twisted pair and unshielded twisted pair are the types of twisted pair cables which act as transmission medium and impart reliable connectivity of electronic equipment.

Shielded Twisted pair (STP) cable has an additional braided mesh coating or metal foil that wraps each ^{int of} insulated conductors. The metal casing intercepts the penetration of electromagnetic noise. It also can eradicate the phenomenon called crosstalk, which is the unwanted effect of one circuit (or channel) on another circuit (channel).

Unshielded Twisted pair (UTP) cable is the most prevalent type of telecommunications medium in use today. Its frequency range is suitable for transmitting both data and voice. These are therefore, most commonly used in telephones.

Q3. What is the difference between baseband and broadband transmission?

Ans. → Both baseband and broadband describe how data is transmitted between two nodes. Baseband technology transmits a single data signal/stream/channel at a time, while broadband technology transmits multiple data signal/stream/channel simultaneously at the same time.

Q4. What is the difference between a hub, modem, router and a switch?

Ans. →

Hubs: Hubs are devices that broadcast data to all ports, which is inefficient, so hubs are basically multipoint repeaters.

Modem: Modem are hardware devices that allow a computer or another device, such as a router or switch, to connect to the internet. They convert or modulate an analog signal from a telephone or cable wire to digital data (1s and 0s) that a computer can recognize.

Router: Routers are responsible for sending data from one network to another. It works at Layer 3 (Network) of the OSI model, which deals with IP addresses.

Switch: Switches use the MAC address of a device to send data only to the port the destination device is plugged into.

Q5 When you move the NIC cards from one PC to another PC, does the MAC address get transferred as well?

Ans. → Yes, when NIC cards from one PC is moved to another PC, the MAC address gets transferred as well. This is because MAC Address is assigned to a NIC at the time of manufacturing.

Q6 When troubleshooting computer network problems, what common hardware-related problems can occur?

Ans. → A large percentage of a network is made up of hardware. Problems in these areas can range from malfunctioning hardware, broken NICs and even hardware startups.

Q7 In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program?

Ans. → The best place for the installation of Anti-virus program in a network is the server.

Q8 Define Static IP and Dynamic IP. Discuss the difference between IPV4 and IPV6.

Ans. → Static IP address is simply an address that does not change. Once the device is assigned a static IP address, that number typically stays the same until

the device is decommissioned

Dynamic IP addresses are subject to change, sometimes at a moment's notice. Dynamic IP addresses are assigned as needed, by DHCP servers.

The major differences between IPv4 and IPv6

IPv4	IPv6
(a) Encryption and authentication is not provided in IPv4	(a) Encryption and authentication is provided in IPv6
(b) Header of IPv4 is 20-60 bytes	(b) Header of IPv6 is fixed at 40 bytes
(c) Checksum field is available in IPv4	(c) Checksum field is not available in IPv6
(d) Packet flow identification is not available in IPv4	(d) Packet flow identification is available in IPv6. Flow label is available in the header
(e) IPv4 addresses are usually represented in dot-decimal notation, consisting of four decimal numbers, each ranging from 0 to 255, separated by dots.	(e) An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits.
(f) Sending and forwarding routers performs fragmentation in IPv4	(f) Fragmentation is performed only by the sender in IPv6
(g) In IPv4, security features relies on application	(g) In IPv6, there is an inbuilt security feature named IPSEC
(h) End to end connection integrity cannot be achieved in IPv4	(h) End to end connection integrity can be done in IPv6
(i) IPv4 supports DHCP and manual configuration	(i) IPv6 supports renumbering and auto address configuration.

(j) IPv4 addresses are 32-bit long

(k) The address space in IPv4 is 4.29×10^9

(l) IPv4 has a broadcast message transmission scheme

(j) IPv6 addresses are 128 bit long

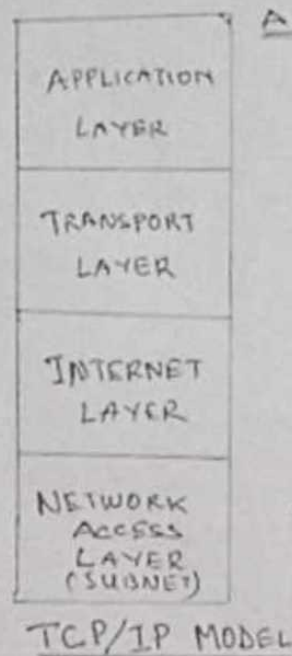
(k) The address space in IPv6 is 3.4×10^{38}

(l) Multicast and Anycast message transmission scheme is available in IPv6.

Q9

Discuss TCP/IP model in detail.

Ans:



APPLICATION: This layer is comparable to the presentation, and session layers of the OSI model all combined into one

- It provides a way for applications to have access to network services
- This layer also contains the high-level protocols.

TRANSPORT

- This layer acts as the delivery service used by the application layers.
- Again the two protocols used are TCP and UDP
- The choice is made based on the applications transmission reliability requirements

- The Transport layer also handles all error detection and recovery
- It uses checksums, acknowledgements, and timeouts to control transmissions and end to end verification
- TCP/IP treats reliability as end to end problem

INTERNET :

- This layer is also known as Internet layer. The main purpose of this layer is to organize or handle the movement of data on network.
- By movement of data, we generally mean routing of data over the network. The main protocol used at this layer is IP. While ICMP and Icmp are also used at this layer.

NETWORK :

- This layer is also known as network interface layer.
- This layer normally consists of device drivers in the OS and the network interface card attached to the system.
- Both the device drivers and the network interface card take care of the communication details with the media being used to transfer the data over the network.
- In most cases, this media is in the form of cables.
- Some of the famous protocols that are used at this layer include ARP, PPP etc.

Q10

What is a Web Browser? Give some examples of browsers.

Ans

→ A Web Browser is an application software for accessing the World Wide Web. When a user requests a web page from a particular website, the Web Browser retrieves the necessary content from a web server and then displays the page on the user's device.

(7)

Examples of Browsers:

- (a) Opera (b) Google Chrome (c) Internet Explorer
(d) Mozilla Firefox (e) Safari

Q11

What is a Search Engine? Give example.

→ A Search Engine is a website that provides links to other websites.

Examples of Search Engines:

- (a) Google (b) Bing (c) Yahoo (d) AOL
(e) Ask.com (f) Excite

Q12

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

Ans

→ Internet is the global system of interconnected computer networks that uses the Internet Protocol suite (TCP/IP) to communicate between networks and devices. It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope linked by a broad array of electronic, wireless and optical networking technologies.

WWW stands for World Wide Web.

WWW can be defined as "All the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP)". It is simply a way of accessing information over the medium of the Internet.

Uses of the Internet in our daily life, depends on individual requirement: Some of them are

- (a) For Educational purposes
- (b) For Online Shopping
- (c) For Research and Development
- (d) For Business promotions and Innovation
- (e) Communication
- (f) Digital transactions
- (g) Tour and Travel

Q13

What is an Internet Service Provider? Give example of ISP in India.

Ans

→ An ISP (Internet Service Provider) is a company that provides individuals and other companies access to the Internet and other related services such as website building and virtual hosting.

Example of ISP in India

- (a) Reliance Jio
- (b) Airtel
- (c) Vodafone Idea
- (d) BSNL
- (e) MTNL

Q14 Discuss the Difference between MAC address, IP address and port address.

Ans. → MAC address is used to ensure the physical address of computers. It uniquely identifies the devices on a network.

IP addresses are used to uniquely identify the connections of network with that device that take part in a network.

Port number is the part of the addressing information used to identify the sender & receiver of messages in computer networking. Different port addresses are used to determine what protocol incoming traffic should be directed to.

Q15 How do we view my Internet browser's history?

Ans. → To access or view Internet browser's (Internet Explorer) history:

Step 1: Select the Favorites button,

Step 2: Select the History Tab