Certificate in Computer Applications (CCA)

102: DATA COMMUNICATIONS

ASSIGNMENT

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Q. 1. What are the different types of networks ?

Ans → Types of Networks :-

1. Personal Area Network (PAN) :-

The Smallest and most basic type ob network, a PAN is made up of a wireless modem, a computer or two, Phones, Printers, tablests etc, and resolves around one Person in building.

2. Local Area Network (LAN) :-

A Local area network is usually Privately owned and links the devices in a Single office, building.

3. Wireless Local Area Network (WLAN) :-

Functioning like a LAN, WANS make use of wireless network technology, Such as Wi-fi, Typically Seen in the Same type of networks don't require that device rely on physical Cables connect to the network.

4. Campus Area Network (CAN):-

Larger than LANs, but smaller than metropolitan area network (MANs). Typically seen in universities, large K-12 school districts or small business.

5. Metropolitan Area Network (MANs):-

These types networks are larger than LANs but smaller than WANs - and incorporate elements from both types of networks.

6. Wide Area Network (WANs):-

Slightly more complex than a LAN. a WAN connects computers together across larger physical distances.

7. Storage Area Network (SAN):-

As a dedicated high-Speed network that connects shared pools of storage devices to several Servers. these types of networks don't rely on a LAN or WAN.

8. System Area Network (also known as SAN):-

This term is fairly new within the past two decades. It is used to explain a relatively local network that is designed to

Provide high-speed connection in Server-to-Server applications.

9. Passive Optical Local Area Network (POLAN):-

As an alternative to traditional Switch based Ethernet LANs. POLAN technology can be integrated into structured Cabling to overcome Concerns about Supporting traditional.

10. Enterprise Private Network (EPN):-

These type of network are built and owned by business that want to securely connect its various locations to share computer resources.

11. Virtual Private Network (VPN):-

By extending a Private network across the Internet, a VPN lets its users send and receive data as if their devices were connected to the Private network - even if they're not. Through a virtual point-to-point connection, users can access a private network remotely.

Q. 2. Explain the shielded twisted pair (STP) and Unshielded twisted pair (UTP)

Ans → Shielded twisted pair (STP) :-

STP Cable has an additional braided mesh coating or metal foil that wraps each set of insulated conductors. The metal casing intercepts the penetration of electromagnetic noise. It also can eradicate a phenomenon called crosstalk. which is the unwanted effect of one circuit (or channel) on another circuit (or channel).

It occurs when one line acting as a kind of receiving antenna) picks up some of the signals travelling down another line (acting as a kind of sending antenna). This effect can be experienced during telephone conversation in the background. Shielding each pair of a twisted pair cable can eliminate most crosstalk.

STP has the similar quality factor and uses the same connectors as UTP, but the shield must be connected to the ground.

Unshielded twisted pair (UTP) :-

UTP cable is the most prevalent type of telecommunication medium in use today. Its frequency range is suitable for transmitting both data and voice. Therefore, these are most commonly used in telephone systems.

A twisted pair consists of two insulated conductors (usually copper) in a twisted configuration. Color bands are used in plastic insulation for indentification. In addition, colors also indentify the specific conductors in a cable and to indicate which wires belong in pairs and how they relate to other pairs in a larger bundle.

The two wires are twisted in the twisted pair cable which significantly reduces the noise generated by the external source. The noise here we are talking about is generated when two wires are parallel which causes an increase in voltage level in the wire closest to the source and also uneven load and damaged signal.

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

Ans →

S.No.	Baseband	broadband
1.	In baseband transmission, the typ of Signalling used is analog.	In broadband transmission, the type of Signalling used is digital.
2.	Baseband Transmission is unidirectional in nature.	Broadband Transmission is bidirectional in nature.
3.	Signals can be travelled over long distance without being attenuated.	Signal can only travel over short distances.
4.	It is used with a bus as well as tree topology.	It works well with bus topology.
5.	Only PSK encoding is used.	In broadband transmission, Manchester and different manchester encoding are used.

Q.4. what is the difference between a hub, modem, router and a Switch?

Ans → Difference between a hub, modem, router and a Switch :-

Hub :-

Unlike Switches, hubs broadcast data to all ports, which is inefficient. So hubs are basically a multiport repeaters.

Modem :-

Stands for "modulating - demodulating": modems are hardware devices that allows a computer or another device, such as a router or Switch. to connects 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. Simply Send traffic from point A to point B without further manipulation.

Routers :-

Are resposible for Sending data from one network to another. Work at Layer 3 (Network) of the OSI model, which deals with ib address. Typically routers today will perform the functionally of both a router and Switch.

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

Ans → The Media access control address for any network adapter is hard coded into the Card itself. Each manufacture of network adopters has a group of characters assigned that refer Specifically to that company. I belive that is the first ½ of the MAC address which is 12 hexadecimal characters long. But the MAC address is part and Parcel of the network adopter. Just as your internal organs are part of you. When you move to a new house, you take your liver with you. In the Same way, when you move a NIC to a different computer, it takes its MAC address with it.

Switches :-

They use the MAC address of a device to send data only to the port the destination device is plugged into. work at layer2 (Data link) of the OSI model, which deals with MAC address.

Q. 6. When troubleshooting Computer network Problems, what common hardware - related Problems can occur ?

Ans → The term troubleshooting refer to the Process of identifying problems with a network through a rigorous and repeatable Process and them Solving those Problems using testable methods. Troubleshooting is more effective than trying things at random until the network functions. and encourages you to document your process. Network troubleshooting is useful for almost anyone, from a Computer enthusiast to an aspiring network engineer.

The Common hardware - related problems can accurs :-

when you're beginning the troubleshooting process, check all your hardware to make Sure it's connected Properly, turned on, and working. If a Cord had come loose or Somebody has Switched off an important router, this Could be the problem behind your networking issues. There's no point in going through the process of troubleshooting network issues if all you need to do is plug a Cord in

and don't have to install additional software on your Computer.

S.No	IPV4	IPV6
1.	IPV4 has 32-bit address length.	IPV6 has 128-bit address length
2.	It Supports Manual and DHCP address Configuration.	It Supports Auto and renumbring address Configuration.
3.	In IPV4 end to end Connection integrity is Unachievable.	In IPV6 end to end Connection integrity is Achievable.
4.	It can generate 4.29×10^9 address Space	Address Space of IPV6 is quite large it Can produce 3.4×10^{38} address Space
5.	Security feature is dependent on applicatio	IRSEC in inbuilt - Security feature in the IPV6 protocol.
6.	Address representation of IPV4 is in decimal	Address repersentation of IPV6 is in hexadecimal

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

Ans → A good firewall. This can stop intrusions, malware, unathorized access. etc. before they reach the workstation.

Antivirus Software on the Servers and at the endpoint workstations. This Software should be Centrally managed to keep end users updated Constatly and to minimize user medding with the Settings. Good antivirus will also protect email clients.

Educated and aware users who: do not casually install downloded programs; dont click on unknoion links; dont fall for phishing emails, etc. Establish a strong password policy for all users. you should consider not giving your users Administrative rights they cannot install what they need and your workstation will increase but, I guarantee you, your entire environment will be more reliable, and Secure.

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

Ans → Static IP :-

Use advanced Setting to reserve an IP address for a device on your local network. your device keeps the same IP address until you Cancel the reservation or remove the device from your network, even if the device is disconnected.

when you Sign up for Google Fiber for Small business, you can choose to have no static IPs (that is dymamic IPs for all your devices), One static IP, or muliple Static IPs. The number of Static IPs available is Shown on the Screen when you Sign up for Service. If you Sign up for static IPs, we will assign addresses to you when you Service is installed and activated.

Dynamic IP :-

Use advanced Setting for your network to Configure dynamic DNs. when your IP address changes, the DNs entry for your Server is automatically updated with its new IP address, So outside users can use the Same domain name. You Can choose the Dynamic DNs provider

Make Sure all Switches are in the correct positions and haven't been bumped accidentally. Next, turn the hardware off and back on again. This is the mainstay of IT troubleshooting and while it might Sound Simplistic, often it really does Solve the problem. Power cycling your modem, router, and PC can Solve Simple issues - just be Sure to leave each device off for at least 60 Seconds before you turn it back on.

Q.9. Discuss TCP/IP model in detail.

Ans → The TCP/IP model (Transmission Control protocol/Internet protocol) is a model with four layers which is for both modelling current internet architecture, as well as providing a set of rules that govern all forms of transmission over a network. DARPA, an agency of the United States Department of Defense, created it in the 1970s. It evolved from ARPANET, which was an early wide area network and a predecessor of the Internet. The TCP/IP Model is sometimes called the Internet Model or less often the DoD Model.

This model was being made at the same time as the OSI model was created. The TCP/IP model is not the same as the OSI model, however it was influenced by the model, which is why many names of the different layers are the same.

The TCP/IP model describes a set of general design guide and implementation of specific networking protocols to enable computers to communicate over a network. TCP/IP provides end-to-end connectivity specifying how data should be formatted, addressed, transmitted, routed and received

at the destination. Protocols exist for a variety of different types of communication services between computers.

TCP/IP has four abstraction layers as defined in RFC 1122: link layer, IP layer, transport layer and application layer, architecture with the seven layer OSI Reference Model; using terms such as Internet reference model. This is incorrect, however, because it is descriptive while the OSI Reference Model was intended to be prescriptive, hence being a reference model.

10. What is a Web Browser (Browser)? Give Some example of browsers.

Ans → A web browsers, or browsers for short, is a Computer Software application that enables a person to locate, retrieve, and display content such as webpages, images, video as well as other files on the world wide web.

Browsers work because every web page, image, and video on the web has its own unique Unifrom Resource locator (URL), allowing the browser to identify the resource and retrieve it from the web Server.

Some of example of Browsers :-

1. Google chrome :- Chrome, created by internet giant Google, is the most popular browser in the USA, preceived by its Computer and Smartphone users as fast, Secure, and reliable. There are also many options for Customization in the shape of useful extensions and opps that Can be downloded for free from the Chrome Store.

2. Apple Safari :- Safari is the defoult on Apple Computers and phones, as well as

other Apple devices. It's generally considered to be on efficient browser. Its slick design being in keeping with the ethos of Apple.

3. Microsoft Internet Explorer and Edge :- Although it has been discontinued, Internet Explorer is worthy of mention as it was the go-to browser in the early days of the internet revolution, with usage share rising to 95% in 2003.

4. Mazilla Firefox :- Unlike Chrome, Safari, Internet explorer, and Microsoft edge, Firefox is on open-source browser, Created by Community members of the Mazilla Fundation. it is perhaps the most customizable of the main browser, with many add ons and extensions to choose from. It late 2003, it had a usage share of 32.21% before gradually losing out to Competition from Google chrome.