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Name: Md.

Answer to the question no.(01)

(a) What do you mean by data communication and computer Network?

Ans: Data communications refers to the digital transmission of this digital transmission of this digital data between two or more computers and a computer Network is a telecommunications network that allows computers to exchange data.

(B)

Briefly explain application of Data communication and computer networks.

Ans. The Application of Data communication and computer Networks are given below :-

1) Resource Sharing such as printers and storage devices.
2) Exchange of Information by means of Emails and FTP.
3) Information sharing by using web or internet
4) Interaction with other users using dynamic web pages.
5) video conferences.
6) parallel computing.
7) Instant messaging.

(c)

~~Why do learn computer network? Describe the~~

(c)

Why we learn Data communication and computer network?

Ans:

1) Network Basic Understanding :-

A system of interconnected computers and computerized peripherals such as printers is called computer network. This interconnection among computers facilitates information sharing among them. computers may connect to each other by either wire or wireless media.

2) Network Engineering :-

Network engineering is a complicated task which involves software, firmware, chip level

engineering, hardware, and electric pulse.
To ease network engineering, the whole networking concept is divided into multiple layers. But as a whole, almost all networking tasks depend on all of these layers.

Internet: A network of networks is called an internetwork, or simply the internet. It is the largest network in existence on this planet. The internet hugely connects all WANs and it can have connection to LANs and Home networks. Internet uses TCP/IP protocol suite and uses IP as its addressing protocol. present day, Internet is widely implemented using IPv4. Because of shortage of address spaces. It is gradually migrating from IPv4 to IPv6.

I Reference Model

Ans. to the qun: No: 02

(a)

What is Computer Network?

Ans: A computer network is defined as the interconnecting of two or more computers. It is done to enable the computer to communication and share available resources.

(b)

Classification of Computer networks. Briefly explain Different types of Computer networks.

Ans: Computer Networks are classifed based on various factors. They includes;

* Geographeical span.
* Inter-Connectivity.
* Administration.
* Architecture.

Geographical Span: Geographically a Network can be seen in one of the following categories:

* It may be Spanned across your table, among Bluetooth enabled devices. Ranging not more then few meters.
* It may be spanned across a whole building, Including intermediate devices to connect all floors.
* It may be spanned across a whole city.

Inter-Connectivity: Component of a network can be connected to each other differently in some fashion. By Connectedness we mean either logically, physically or both ways.

* Every single device can be connected to every other device on network making the network mesh.

* All devices can be connected to a single medium but geographically disconnected created bus like structure.

* Each device is connected to its left and right peers only, creating linear structure.

Administration: From an Admeinistrator's point of view, a network can be private Network which belongs a single autonomous system and cannot be accessed outside its physical or logical domain. A network can be public which is accessed by all.

Network Architecture: Computer Networks can be discriminated into various type such as Client-Server, peer-to-peer or hybrid, depending upon its architecture.

* There can be one or more System acting as Server. other being Client, request the Server to server requests. Server takes and processes request on behalf of Client.

* Two System can be connected point-to-point or in back-to-back fashion. They both reside at the same Level and called peers.

(c)

Application of network:

Ans: Computer systems and peripherals are connected to form a network. They provide numerous advantages:

1) Resource sharing such as printers and storage devices

2) Exchange of information by means of e-mails and FTP.

3) Interaction with other users using dynamic web pages.

4) Ip phones.

5) Vedio conferences

6) parallel computer

7) Instant messaging.

Ans to the qus: No: 03

(a)

What Computer Net

What is Computer network components?

Ans: Compact network components are the major parts which are needed to install the Software. Some important network components are NIC, Switch, cable, hub, router and modem.

(b)

Briefly explain computer network Types?

Ans: A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data and applications.

A computer Network can be categorized by their size. A computer Network is mainly of four types:

1) LAN (Local Area Network)
2) PAN (personal Area Network)
3) MAN (metropolitan Area network)
4) WAN (Wide Area Network)

LAN (Local Area Network):

- Local Area Network is a group of computer connected to each other in a small area such as building, office.
- LAN is used for connecting two or more personal computer through a communication medium such as twisted pair, Coaxial cable, etc.

(*) Local Area Network provides higher Security!

PAN (personal Area Network):-

(*) personal Area Network is a Network arranged within an individual person, typically within a range of 10 meters.

(*) personal Area Network is used for connecting the computer devices of personal Use is known as personal Area Network.

(*) personal Area Network covers an area of 30 feet.

MAN (Metropolitan Area Network):-

(*) A metropoletan area Network is a network that covers a Larger geographic area by ~~to~~ interconnecting a diffent LAN to form a Larger network.

- Government agencies use MAN to connect to the citizens and private industries.
- It has a higher range the Local Area Network (LAN)

WAN (Wide Area network):-

- A wide Area network is a network that extends over a large geographical area such as states or countries.
- A wide Area network is quite bigger network than the LAN.
- The internet is one of the biggest WAN in the world.
- The internet is one of the biggest WAN in the world.

(c)

What do you mean Internetworking? Briefly explain Types of Internetworking.

Ans: An internetwork is defined as two or more computer network LANs or WAN or computer network segments are connected using devices, and they are configured by a local addressing scheme. This process is known as internetworking.

Types of internetwork:

1. Extranet: An extranet is a communicatio network based on the internet protocal such as Transmission control protocal and internet protocal. It is used for information sharing. The access to the extranet is restricted to only those users who have login credentials.

2. Intranet: An intranet is a private network based on the internet protocol such as Transmission control protocol and internet protocol. An intranet belongs to an organization which is only accessible by the organizations employee or members. The main aim of the intranet is to share the information and resources among the organization employees. An intranet provides the facility to work in Group and for teleconferences.

Ans: to the qus: No: 04

(a)

What is Topology?

Ans: Topology defines the structure of the network of how all the components are interconnected to each other.

(b)

Briefly explain different types of network topology.

Ans: Explain below some different types of network:-

Bus topology: (1) The bus topology is designed in such a way that all the stations are connected through a single cable known as a backbone cable.

(2) Each node is either connected to the backbone cable by drop cable or directly connected to the backbone cable.

(3) The configuration of a bus topology is quite simpler as compared to other ~~top~~ topologies.

Ring Topology:

1) Ring topology is like a bus topology, but with connected ends.

2) The node that receives the message from the previous computer will retransmit to the next node.

3) The data flows in one direction, i.e, it is unidirectional.

4) The data flows in a single loop.

Star topology :

(1) Star topology is an arrangement of the Network in which every node is connected to the central hub, switch or a central computer.

(2) The central computer is known as a server, and the peripheral devices attached to the server are known as clients.

(3) Coaxial cable or RJ-45 cables are used to connect the computers.

Tree topology :

(1) Tree topology combines the characteristics of bus topology and star topology.

(2) A tree topology is type of structure in which all the computers are connected

with each other in hierachical fashion

(3) The top-most node ~~the~~ in tree topology is known as a root node, and all othe nodes are the descendants of the root node.

(4) There is only one path exists between two nodes for the data transmission. Thus, it forms a parent-child hierarchy.

(c)

What is Transmission modes? Briefly explain different types of transmission modes.

Ans: The way in which data is ~~transmi~~ transmitted from on device to another device is known as transmission mode.

Transmission mode is devided into three categories:

1) Simplex mode
2) Half-Duplex mode
3) Full-Duplex mode.

Simplex mode:

(*) In simplex mode the communication is Undirectional, i.e., the data flow in one direction.

(*) A device can only send the data but cannot receive it or it can receive the data but cannot sent the data.

(*) The radio station is a simplex channel as it transmits the signal to the listeners but never allows them to transmit back.

Half-Duplex mode:

(A) In a Half-duplex channel, direction can be reversed, i.e., the station can transmit and receive the data as well.

(A) Messages flow in both the directions, but not at the same time.

(A) A walkie-talkie is an example of the Half-duplex mode. In walkie-talkie, one party speaks, and another party listens. After a pause, the othe speaks and first party listen. Speaking simultaneously will create the distorted sound which cannot be understood.

Full-duplex mode:

(*) In Full duplex mode, the communication is bi-directional, i.e., the data flow in both the directions.

(*) Both the stations can sent and receive the message simultaneously.

(*) The Full-duplex mode is the fastest mode of communication between device.

(*) The most common example of the Full-duplex mode is a telephone network. When two people are communicating with each other by a telephone line, both can talk and listen at the same time.

Ans: to the qus: No: 05

(a)

What is Computer network models?

Ans: For data communication to take place and two or more users can transmit data from one to other, a systematic approach enables users to communicate and transmit data through efficient and ordered path. It is implemented using models in computer networks and are known as computer network models.

(b)

What is OSI computer network model? explain the OSI model.

Ans: (1) The OSI model is one of the general purpose networking or communication model

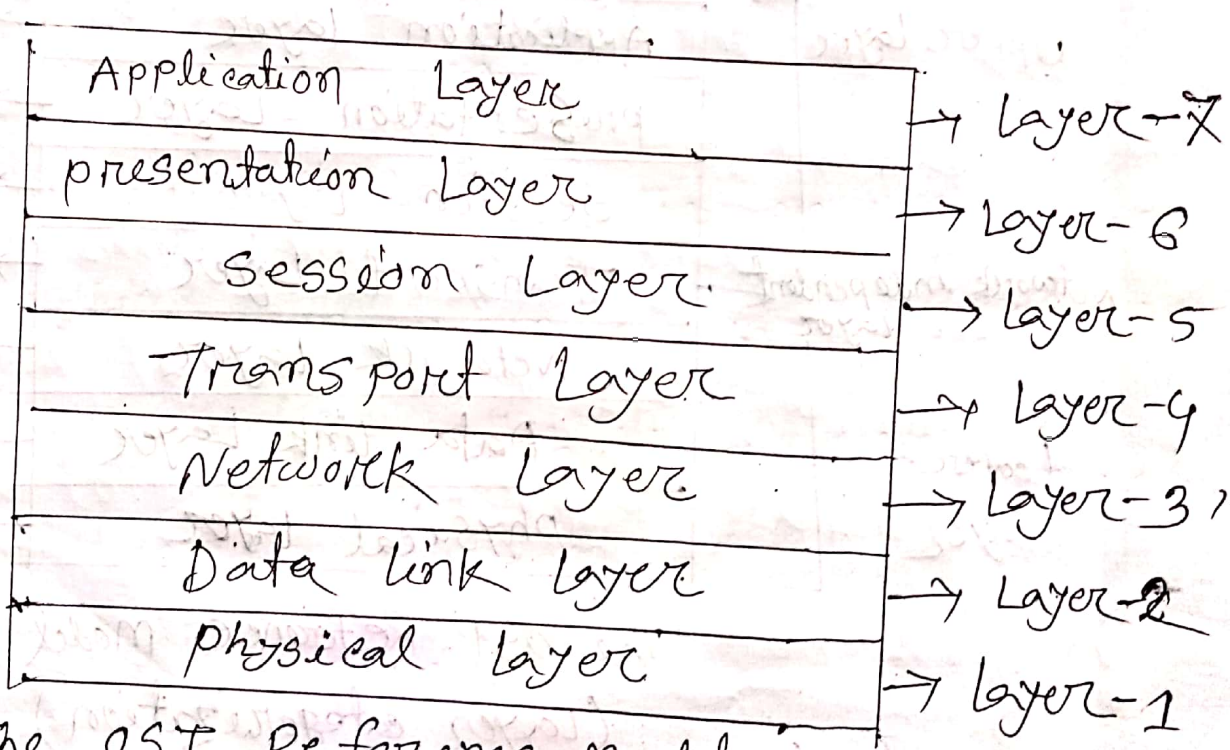
among computer network models, which is responsible for establishing connection in an open manner between all the communicable devices present across the globe.

(2) OSI stands for "open System ~~inter~~ Interconnection" and the name of the reference model was given by an organization known as "International organization for standardization". The OSI is responsible for generating and promoting industrial and commercial standards applicable for all the users or Universally.

(3) Apart from OSI model, another computer network models which is widely used is TCP/IP model.

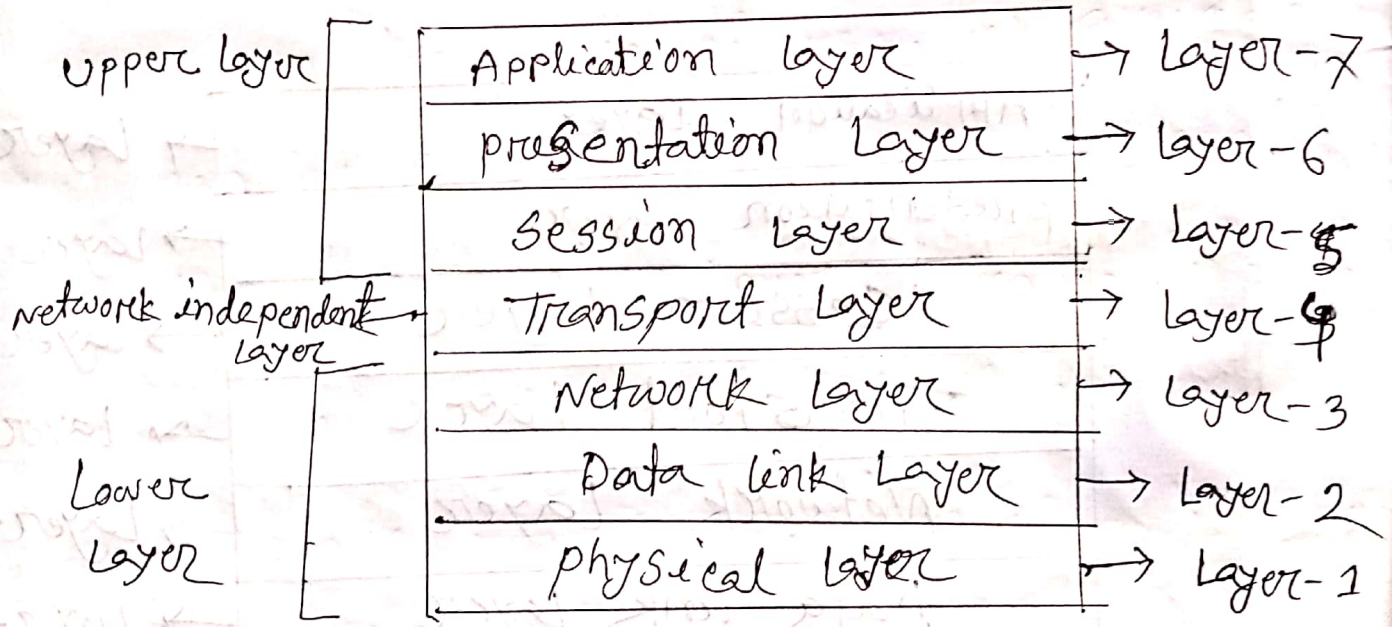
(4) OSI model having a layered architecture, allows easy data communication as each layer has predefined structured and functionalities.

(5) The functionalities are different for each layer and thus when combined together forms the OSI Model. There are in total seven layers in general purpouse OSI model.



The OSI Reference Model

(6) The seven layer of OSI model are further categorized into upper layers, Network Independent layer and Lower layer. physical layer, Data link layer and network layer are categorized as Lower layers. Transport layer as network independent layer and Session Layer, presentation layer, Application layer as upper layers.



The OSI Reference Model (Layer categorization)

A) The physical layer: The physical layer is the bottom most layer and is associated with electrical, mechanical ~~with~~ and functional aspects of the transmission media for information and receiving over internet.

B) The Data link layer: The Data link layer is second from bottom and comes under the lower layer catagory. It ensures that the data must be synchronized, error detection and control are enabled.

(C) The network Layer: The network layer is third from bottom in OSI model and is responsible for establishing data communication channel between multiple networks or devices or hosts or nodes.

D) The Transport Layer: Transport layer is the middle most layer in OSI model and it acts as network Independent Layer. It has no idea about the fonctioning of lower layer i.e. physical, data link and network layer.

E) The Session Layer: Session layer is the fifth layer of OSI model and it provides appropriate sessions between users and entities, where user interacts. The layer can be used on the basic of resources available and it can be skipped too if not requeired.

F) The preasentation Layer: This is the Sixth Layer of OSI model and it provides appropriate ~~resp~~ representation of data through various data presentation techniques.

c) The Application Layer: Application layer is the topmost layer of the OSI model and has the responsibility for providing interface between various users and application.

(c)

Different between OSI model and TCP/IP model

Ans:

TCP/IP	OSI
1) implementation of OSI model	1) Referenee model
2) Model around which internet is developed	2) This is a theoritical model
3) Has only 4 Layers	3) Has 7 Layers
4) Considered more reliable	4) Considered a reference tool.
5) protocols are not strictly defined	5) Stricter boundaries for the protocals
6) protocol dependent standard.	6) protocol independent standard.

Ans to the question no: 06

(a)

What is application layer?

Ans: The Application layer in the OSI model is the closest layer to the end user can interact directly with the Software application. The application layer program are based on clint and servers.

(B)

Briefly describe the Application Layer function

Ans: The Application layer includes the following function.

1) Identifying communication partner: The application layer identifies the availability of communication partners for an application with data to transmit.

2) Determining ~~reset~~ resource availability: The Application Layer determines whether sufficient network resources are available for the requested communication.

3) Synchronizing communication: All the communications occur between the applications requires cooperation which is managed by an application layer.

(c)

Services of Application layers.

Ans:

1) Network virtual terminal: An application layer allows a user to log on to a remote host. To do so, the application creates a software emulation of a terminal at the remote host. The users computer talks to the

host. The remote host thinks that it is communicating with one of its own terminals, so it allows the user to log on.

2) File Transfer, Access, and Managment (FTAM):

An application allows a user to access files in a remote computer, to retrieve files from a computer and to manage files in a remote computer. FTAM defines a hierarchical virtual file in terms of the structure, file attributes and the kind of operations performed on the files and their attributes.

3) Addressing: To obtain communication between client and server, there is a need for addressing. When a client made a request to the server, the request contains

the server address and its own address. The server response to the server client request, i.e., client address. To achieve this kind of addressing. DNS is used.

4) Mail Services: An application layer provides Email forwarding and Storage.

5) Directory Services: An Application contains a distributed database that provides access for global information about various object and services. Authentication

Authentication: It authenticates the sender or receiver's message or both.

Ans: to the qus: NO: 07

(a)

What is Client and Server?

Ans: Client: 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 termenates when the service is completed.

Server: A server is a program that runs on the remote machine providing service to the clients. when the client requests for a service, then the server opens the door for the incoming requests, but it never initiates the service.

(b)

Advantages and Disadvantages of client-server network.

Ans:

Advantages	Disadvantages
1) All files are stored in a central location.	1) A specialist network operator system is needed.
2) network peripherals are controlled centrally	2) The server is expensive to purchase
3) Backups and network Security is controlled centrally	3) Specialist staff such as a network manager is needed.
4) User can access shared data which is centrally controlled	4) if any part of the Network fails a lot of disruption can occur.

(c)

Briefly describe few Application layer protocols

Ans:

Domain name System: The Domain system (DNS) works on client server model. It uses UDP protocol for transport layer communication. DNS uses hierachical domain based naming Scheme. The DNS server is configured with Fully Qualified Domain Names (FQDN) and Email addresses mapped with their respective Internet protocol addresses.

A DNS server is requested with FQND and it responds back with the IP address mapped with it. DNS uses UDP port 53.

Simple Mail Transfer protocol: The Simple Mail Transfer ~~Mail~~ protocol (SMTP) is used to transfer electronic mail From one User to another. This task is done by means of email client Software (User Agents) the User is using. User Agents help the user to type and format the email and Store it until internet is available. when an email is submitted to send, the Sending process is handled by message Transfer Agent which is normally comes inbuilt in email client Software. Clint Software uses Internet message Access protocol (IMAP) or pop protocols to receive email.

Hyper Text Transfer protocol (HTTP):

The Hyper Text Transfer protocol (HTTP) is the foundation of world wide web. Hypertext is well organized documentation system which uses hyperlinks to link the pages in the text documents. HTTP works on client server model. when a user wants to access any HTTP page on the internet, the client machine at user and initiates a TCP connection to Server on port 80. when the server accepts the client request, the client is authorized to access web pages.

HTTP versions

* HTTP 1.0 uses non persistant HTTP. At most one object can be sent over a single TCP connection.

* HTTP 1.1 uses persistent HTTP. In this version, multiple objects can be sent over a single TCP connection.

Ans. to the qus: No: 08

(a)

Define computer services?

Ans: computer services means providing services consisting of specifying computer hardware configurations and evaluating technical processing characteristics, computer programming and training of computer programmers and operators, provided in conjunction with and to support the sale, lease, or operation of datable computer equipment or systems.

(b) Briefly describe different types of computer network services.

Ans:

1) Directory services: These services are mapping between name and its value, which can be variable value or fixed. This software system helps to store the information, organize it, and provides various means of accessing it.

* Accounting: In an organization, a number of users have their user names and passwords mapping to them. Directory services provide means of storing this information in cryptic form and make available when requested.

* Authentication and Authorization: User credentials are checked to authenticate a user at the time of login and/or periodically. User accounts can be set into hierarchical structure and their access to resources can be controlled using authorization schemes.

2) File Services: File Services include sharing and transferring files over the network.

- File Sharing: One of the reason which gave birth to networking was file Sharing. File sharing enables its users to share their data with other

users. User can upload the file to a specific server, which is accessible by all intended users. As an alternative user can make its file shared on its own computer and provides access to intended users.

- File transfer: This is an activity to copy or move file from one computer to another computer or to multiple computers, with help of underlying network. Network enables its user to locate other users in the network and transfers files.

3) Application services:- These are nothing but providing network based services to the users such as web services, database managing, and resource sharing.

- Resource Sharing: To use resources effiecently and economically, Network provides a mean to shar them. The's may include Servers, printers and storage media etc.

- Databases: This application service is one of the most important services. it stores data and information, processes it and enables the users to retrieve it effiecently by using queries. Databases help organizations to make decision based on statistics.