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CT-01

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Question :

1. a) What is data communication and computer network ? Explain. (3)

b) Write down the applications of communication and computer network. (3)

c) Why learning data communication and computer network is important ? Explain with example. (5)

d) What is IPV4 addressing ? What destination address is 255.255.255.255 for ? (3)

2. a) Define computer netwon. (2)

b) Briefly explain the classification of computer network. (5)

c) Differentiate between computer network types with examples. (7)

3. a) Write down the effectiveness in data communication ? Write down network criteria. (3+3)

b) Identify the components of data communication systems. (4)

c) What is distributed processing ? why we use it ? what are the advantages of distributed processing (2+2)

4. a) Define cryptography. How it works ? (2+3)

b) Define ~~sequi~~ security threats. Categorize security threats. (2+3)

c) Define network topology. Explain ~~de~~ different network topology. (4)

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5. a) Differentiate LAN technologies. (6)

b) Define OSI model and explain the layer in it. (9)

c) Define internet model. what are the layers in internet model? (4)

d) How OSI and ISO related to each other? (2)

6. a) Define application layer? (3)

b) what is an example of a process application layer protocal? what types of applications run on the application layer? (2+5)

c) Differentiate between client-server and peer-to-peer network. (9)

7. a) Define client- server model. How two processes in client- server model can interact? (2+3)

b) Draw the client-server model for two processes to interact. (4)

c) what are application layer protocol? Explain them. (5)

8. a) what is TCP IP and how does it work? (2+3)

b) How network servies help in our life? (4)

c) Differentiate between physical and logical addres. (3)

d) Define Autonomous system. How do autonomous systems work? How do you create an autonomous system? (2)

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Ans. to the Q. no 1:

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

b) The applications of communiction and computer network is given below:

- ① Resource sharing such as printers and storage devices.
- ② Exchange of information by means of e-mails and FTP.
- ③ Information sharing by using web on internet.

④ GP phones.
⑤ Video conferences.
⑥ Parallel computing.

(c) The importance of learning data communication and computer network in given below:

1. Network Basic Understanding:
A system of interconnected computers and computerized peripherals such as printers is called computer networ.

2. Network Engineering:
Networking engineering is a complicated task, which involves software, firmware, chip level engineering, hardware, and electric pulses.

c. 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.

d) The IPv4 address is a 32-bit number that uniquely identifies a network interface on a system, as explained in How IP address Apply to Network interfaces.

Ans:
255. 255. 255. 255 - This address is reserved for network broadcast, or messages that should go to all computers on the network 127.0.0.1 - This is called the loopback address, meaning your computer's way of identifying itself.

Ans. to the Q. no. 2,

a) 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 wired or wireless media.

b) classification of Computer Networks:

Computer networks are classified based on various factors. They includes:

a. Geographical span.
b. Inter-connectivity.
c. Administration.
d. Architecture.

① Geographical span

Geographically a network can be seen in one of the following categories:

a. It may be spanned across your table, among Bluetooth enable devices, Ranging not more than few meters.

b. It may be spanned across a whole building, including interma-diate devices to connect all floors.

② Inter-connectivity:

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

ⓑ All devices can be connected to a single medium but geographically disconnected.

③ Administration :

From an administrator's point of view, a network can be private network which belongs a single autonomous system and can not be accessed outside its physical or logical domain.

④ Network Architecture :

Computer networks can be discriminated into various types such as client-server, peer-to-peer or hybrid, depending upon its architecture.

c) Personal Area Network :

A personal Area Network (PAN) is smallest network which is very personal to a user. This may

include Bluetooth enabled devices or infra-red enabled devices. PAN has connectivity range up to 10 meters.

Local Area Network:

A computer network spanned inside a building and operated under single administrative system in generally termed as Local area Network (LAN). Usually, LAN covers an organization offices, schools, colleges or universities.

Metropolitan Area Network:

The Metropolitan Area Network (MAN) generally expands throughout a city such as cable TV network.

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Wide Area Network:

As the name suggests, the wide Area Network (WAN) covers a wide area which may span across provinces and even a whole country.

Internetwork:

A network of networks is called an internetwork or simply the ~~intene~~ internet. Some of them are:

(a) Web site.
(b) E-mail.
(c) Instant Managing.
(d) Blogging.
(e) Social Media
(f) ~~Ete~~ Marketing.
(g) Networking.

Ans. to the Q. no. 3

a) Data communications are the exchange of data between two devices via some form of transmission medium such as a wire cable. For data communications to occur, the communicating devices must be a part of communication system made up of a combination of hardware (physical equipment) and software (Programs).

1. Delivery: The system must be deliver data to the correct destination.

2. Accuracy: The system must deliver the data accurately.

3. Timeliness: The system must deliver data in a timely manner.

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4. Jitter: Jitter refers to the variation in the packet arrival time. It is the uneven delay in the delivery of audio or video packets.

A network must be able to meet a certain number of criteria.

① Performance: Performance can be measured in many way, including transit time and response time.

② Reliability: In addition to accuracy of delivery, network reliability is measured by the frequency of failure.

③ Security: Network security issues include protecting data from damage and development.

b) The components of data communication systems in given below:

1. Massage: The message is the information (data) to be communicated.

2. Senden: The senden is the device that sends the data massage.

3. Receiven: The receiven is the is the device that receives the massage.

4. Trammission medium: The Transmimion medium is the physical path by which a massage travels from senden to receiven.

5. Protocol: A protocol is a set of rules that govern data communications.

c) Distributed computing in simple words can be defined as a group of computers that are working together at the backend while appearing as one to the user.

In a distributed system multiple computers can host different software components, but all the computers work to accomplish a common goal.

Distributed system multiple can also consist of different configuration on a combination of configuration such as personal computer, workstation and mainframes.

The advantages of Distributed processing

1. Scalability and Modular Growth.

2. Fault Tolerance and Redundancy
3. Low Latency
4. Cost effectiveness.
5. Efficiency.

Disadvantages of Distributed computing:

1. Complexity.
2. Higher initial cost.
3. Security concerns.

Ans. to the Q. no 6

An application layer is an abstraction layer that specifies the shared communication protocols and interface methods used by hosts in a communications network.

In TCP/IP, the application layer contains the communications protocols and interface methods used in process-to-process communications across and internet protocol (IP) computer network.

b) The following list shows examples of application layer protocols of standard TCP/IP services such as the ftp, tftp and telnet commands... simple network Management protocol (SNMP), which enables network management.

Application layer protocol:

1. TELNET:

Telent stands for the TELecomuni-cations NETwork. It helps in terminal emulation. It allows Telnet client to access the resources of the Telnet server.

2. FTP:

FTP stands for file transfer protocol. It is the protocol that actually lets us transfer files.

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3. NFS :
It stands for network file system. It allows remote hosts to mount file systems over a network and interact with those file systems as though they are mounted locally.

4. TFTP

5. SMTP

6. LPD

7. X window

8. SNMP

9. DNS

10. DHCP

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c) The difference g given below:

CLIENT-SERVER NETWORK	PEER-TO-PEER NETWORK
Focuses on information shaning	Focuses on connectivity
Less expensive to implement	It is less expensive to implement.
Centralized server is used to store the data	Each peer has its own data.
Client-server Network is more stable and scalable	Peer-to-peer network are less stable if number of peer is increased.
It is less reliable	It is more reliable.

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Ans. to the q. no. 8

a) TCP: As indicated in the name, there are two layers to TCP/IP. The top layer, TCP, is responsible for taking large amounts of data, compiling it into packets and sending them on their way to be received by a fellow TCP layer.

IP: The bottom layer, IP, is the locational aspect of the pair allowing the packets of information to be sent and received to the correct location.

The four abstraction layers are the link layer (lowest layer), the internet layer, the transport layer and the application layer.

The work in the following fashion:

1. The Link layer is the physical network equipment used to interconnect nodes and servers.

2. The internet layer connects hosts to one another across networks.

3. The Transport Layer resolves all host-to-host communication.

4. The application Layer is utilized to ensure communication between applications on a network.

b) Network services are given below:

File services

File services include sharing and transferring files over the network.

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• File shaning: One of the reason which gave birth to networking was file shaning. File shaning enable its users to shane their data with other users.

• File Trasfen: This is an activity to copy or move file from one computen to another computen or to multiple computens.

Communication services

. Email: Electronic mail is a communication method and something a computen user cannot work without.

. Social Networking: Recent technologies have made technical like social.

. Internet chat: Internet chat provide instant text tranfen services between two hath.

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Application services :

These are nothing but providing network based services to the users such as wed services, database managing and resource sharing.

. Resource sharing : To use resource efficiently and economically, network provides a mean to share them.

. Database.

. Web services.

Directory Services.

. Accounting.

. Authentication and Authorization.

. Domain Name Services.

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c) The difference between physical and logical address is given below:

Logical Adress	Physical Adress
Logical address is the address that is generated by the central processing unit (CPU) in perspective of a program	Physical address is a location that exists in the memory.
The logical address is generated by the central processing unit (CPU)	Physical address is computed by memory management unit (MMU)
The physical address helps to identify a location in the main memory	The logical address helps to obtain the physical address
Logic address is erased when the system is rebooted	Physical address is not affected when the system is rebooted.

d) An autonomous system (AS) is a network on a collection of networks that are all managed and supervised by a single entity on organization.

An autonomous system is also sometimes referred to as a routing domain. -- Networks with in an autonomous system communicate routing information to each other using an interior Gateway protocol (IGP)

How to make Autonomous system (AS) connections.

1. You must identify the AS to which each of the peering routers belong.

2. You must decide on a group for the peering senior.

3. Imagine, for example, that you have multiple connections between your network and a neighbor network.

4. You must know the specific IP address of the interface to which you are connecting.