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(a) 1. (i)

Ans to the question no: 1(a)

*Describe Data Communication and Computer Networks

Data Communication:

Data communication refers to the exchange of data between a source and a receiver via form of transmission media such as a wire cable. Data communication is said to be local if communicating devices are in the same building or a similarly restricted geographical area.

Computer Network:

Computer network, two or more computers that are connected with one another for the purpose of communicating data electronically. Besides physically connecting computer and communication devices a network system serves the important function of establishing a cohesive architecture that allows a variety of equipment types to transfer information in a near-seamless fashion.

Ans to the question no: 1(b)

* Applications of Data Communication and computer Network?

Ans:

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

* Resource sharing such as printers and storage devices.

* Exchange of information by means of e-Mails and FTP

* Information sharing by using Web or Internet

* IP phones

* video conferences

* Parallel computing

* Instant messaging

Ans to the question no: 1(c)

- Difference between Data Communication and Computer Network?

Ans:

Below is a table of differences between Computer Network and data communication:

Computer Network	Data Communication
Computer Network is best known to transfer the data and information across different geographies.	we can easily communicate and transfer the data data across different nodes through Data communication.
A large community support provided by computer network and extensive documentation libraries	Data communication also has one of the largest community supports
computer network have different types of architectural layers for example client-servers peers to peers or hybrid	Data communication usually have 3 architectural designs and can be useful in the multi nodes transmission across different regions and areas.

Computer Network

In Computer Network performance testing is more preferred than Data Communication.

Data Communication

Data Communication doesn't help in any data binding process and direct inter-related testing for the communication parameters is a little bit difficult than networking.

Ans to the question no: 2 (a)

* What are the basic components of Computer Network?

Ans:

Computer networks components comprise both physical parts as well as the software required for installing computer networks, both at organizations and at home.

Hardware Components :-

- * Servers - Servers are high-configuration computers that manage the resources of the network.
- * Clients - Clients are computers that request and receive service from the servers to access and use the network resources.
- * Peers
- * Transmission Media
- * Connecting Devices
 - a. Routers
 - b. Bridges
 - c. Hubs
 - d. Repeaters
 - e. Gateways
 - f. switches

Software Components :

- * Networking Operating System
- * Protocol Suite
 - a. OSI Model
 - b. TCP / IP Model

Ans to the question no : 2(b)

- * Describe Classification of Computer Networks

Ans :-

Computer networks are classified based on various factors. They includes

1. Geographical span
2. Inter - connectivity
3. Administration
4. Architecture

Geographical Span :

- It may be spanned across your table among Bluetooth enabled devices.
- It may be spanned across a whole city

Inter-connectivity :

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

Administration :

From an administrator'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.

Network Architecture

- Two systems can be connected Point to Point, or in back-to-back fashion.
- There can be hybrid network which involves network architecture of both the above types.

Ans to the question no : 2(c)

* What is the difference between switch and hub?

Basic For Comparison	HUB	SWITCH
Operates on	Physical layers	Data link layers
Types of transmission	Broadcast	Unicast, multicast broadcast
Number of ports	4 (more or less)	24-28 (depending on the type of switch)
Transmission mode	Half duplex	Full duplex
Filtering	No provision of packet filtering	Provided
Collision domain	only me	Different ports have separate collision domain

Ans to the question no : 3(a)

* What is a Node and Routers?

Ans :

Node :

Two or more computers are connected directly by an optical fiber or any other cable. A node is a point where a connection is established. It is a network component that is used to send, receive and forward the electronic information.

Routers :

The router is a network device that connects two or more network segments. It is used to transfer information from the source to the destination. R.

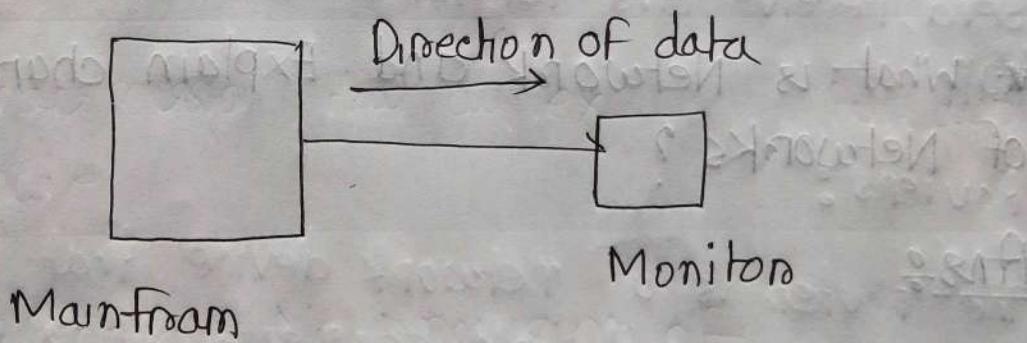
Ans to the question no: 3(b)

* Explain different Data flow direction ?

Communication between any two devices can be simplex, half-duplex, or full-duplex.

1. Simplex :

In simplex mode, the communication is uni-directional, as on a one-way street.



2. Half Duplex :

In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive and vice versa which will represent in the following figure

3. Full-Duplex:

In Full-duplex mode (also called duplex) both stations can transmit and receive simultaneously. The full-duplex mode is like a two-way street with traffic flowing in both directions at the same time.

Ans to the question no: 3(c)

* What is Network and Explain characteristics of Networks ?

Ans:

A network is a set of devices connected by communication links. A network must be able to meet a certain number of criteria. The most important of these are performance, reliability and security.

Performance :

Performance can be measured in many ways including transit time and response time.

Transit time is the amount of time required for a message to travel from one device to another.

Reliability :

In addition to accuracy of delivery, network reliability is measured by the frequency of failure, the time it takes a link to recover from a failure, and the network's robustness in a catastrophe.

Security :

Network security issues include protecting data from unauthorized access, protecting data from damage and development, and implementing policies and procedures for recovery from breaches and data losses.

Ans to the question no : 4(a)

* Explain different layers in OSI Model .

Ans :

The OSI Model is a conceptual framework used to describe the function of a network system .

The 7 layers of the OSI Model

Physical Layer :

The lowest layer of the OSI Model is concerned with electrically or optically transmitting raw unstructured data bits across the network from the physical layer of the sending device to the physical layer of the receiving device .

Data Link Layer :

At the data link layer , directly connected nodes are used to perform node-to-node data transfers where data is packaged into frames

- * Network layers
- * Transport layers
- * Session Layers
- * Presentation Layer
- * Application Layer :

At this layers, both the end user and the application layers interact directly with the software application

Ans to the question no : 4(b)

- * Explain the layers of TCP/IP Model

Ans :-

TCP/IP protocol suite is made of five layers : physical, data link, network, transport and application

At the transport layer, TCP/IP defines three protocols

- * TCP
- * UDP
- * SCTP

1. Physical and Data Link Layers

2. Network Layers

- a. Internetworking Protocol (IP)
- b. Address Resolution Protocol
- c. Internet Control Message Protocol
- d. Internet Group Message Protocol

3. Transport Layers

- a. User Datagram Protocol
- b. Transmission Control Protocol
- c. Stream Control Transmission Protocol

4. Application Layers

(a) Ans to the question no: 4(c)

A write about peer to peer processing

Ans:

Within a single machine, each layer calls upon the services of the layers just below it. Layer 3, for example, uses the services provided by layer 2 and provides services for layer 4. Between machines, layer x on one machine communicates with layer x on another machine. This communication is governed by an agreed-upon series of rules and conventions called protocols. The processes on each machine that communicate at a given layer are called peer-to-peer processes. Communication between machines is therefore a peer-to-peer process using the protocols appropriate to a given layer.

Ans to the question no: 5(a)

- * What are the different types of a network?
? Explain each briefly.

Ans:

There are 4 major types of networks.

1. Personal Area Network (PAN) :

It is the smallest and basic network type that is often used at home.

2. Local Area Network (LAN) :

LAN is used in small offices and Internet cafes to connect a small group of computers to each other.

3. Metropolitan Area Network (MAN) :

It is a powerful network type than LAN. The area covered by MAN is a small city or town.

4. Wide Area Network (WAN) :

It is more complex than LAN and covers a large span of the area typically a large physical distance

These are some other types of the network as well:

- * Storage Area Network (SAN)
- * System Area Network (SAN)
- * Enterprise Private Network (EPN)

Ans to the question no: 5(b)

Name the different types of network topologies and brief their advantages.

Ans :-

Network Topology is nothing but the physical or logical way in which the devices of a network are arranged. Physical topology means the actual place where the elements

of a network are located. Logical Topology deals with the flow of data over the network.

(a) Bus Topology :

In Bus Topology, all the devices of the network are connected to a common cable.

The advantage of bus topology is that it can be installed easily.

(b) Star Topology :

In star Topology, there is a central controller or hub to which every node or device is connected through a cable.

The advantage of the star topology if a link breaks then only that particular link is affected.

(c) Ring Topology :

In Ring Topology, each device of the network is connected to two other devices on

either side which in turn forms a loop.

The advantage of ring topology is that it can be installed easily.

(d) Mesh Topology :

In a Mesh Topology, each device of the network is connected to all other devices of the network.

The advantage of mesh topology is if one link breaks then it does not affect whole network.

Ans to the question no : 5(c)

Explain the difference between baseband and broad band transmission

Answers:

* Baseband Transmission :

A single signal consumes the whole bandwidth of the cable.

* Broadband Transmission :

Multiple signals of multiple frequencies are sent simultaneously

Ans to the question no : 6(a)

* Explain DNS? How are networks classified based on their connections ?

(3) Ans :

DNS stands for Domain Naming Servers. DNS acts as a translator between domain names and IP addresses. As humans remember names, the computer understands only numbers. Generally we assign names to websites and computers like Gmail.com, Hotmail etc.

(d) Networks are classified into two categories based on their connection types. They are mentioned below.

- * Peer-to-peer networks (P2P) : When two or more computers are connected together to share resources without the use of a central server is termed as a peer-to-peer network.
- * Server-based networks : In this type of network, a central server is located to store the data, applications etc. of the clients. The server computer provides the security and network administration to the network.

Ans to the question no: 6(b)

* What is the use of encryption and decryption?

Ans:

Encryption is the process of converting the transmission data into another form that is not read by any other device other than the intended receiver.

Decryption is the process of converting back the encrypted data to its normal form, An algorithm called cipher is used in this conversion process.

Ans to the question no: 6(c)

* Describe the key elements of the protocol?

Ans:

Below are the 3 key elements of the protocol

* Syntax

* Semantics

* Timing

a: How can you recover the data from a system which is infected with a virus?

Ans:

In another system install an OS and antivirus with the latest updates. Then connect the HDD of the infected system as a secondary drive.

Now scan the secondary HDD and clean it then copy the data into the system.

Ans to the question no : 7(a)

* Define TCP ? What are the protocols in application layers ?

Ans :

TCP :

It is connection oriented protocol. It consists byte streams originating on one machine to be delivered without errors on any other machine in the network.

The protocols defined in application layers are

- * TELNET
- * FTP
- * SMTP
- * DNS

Ans to the question no : 7(b)

* What are the design issue of layers ?

- * Addressing technique source and destination address
- * Types of communication
- * Error control
- * Order of message
- * speed matching
- * Multiplexing and demultiplexing

Ans to the question no: 7(c)

- * Define UDP? What do you mean by point to point network?

Ans:

UDP:

It is unreliable connectionless protocol. It is used for one-shot, client-server type.

Point to point network consist of many connections between individual pairs of machines. Large networks are point to point

Routing algorithm plays an important in point to point network. It uses stored and forward technique. It is a packet switching network.

Ans to the question no : 8(a)

* What is Firewall? What is Gateway?

Firewall :

It is an electronic downbridge which is used to enhance the security of a network. Its configuration has two components.

- ① Two routers
- ② Application gateway

Gateway :

It is a protocol converter. It operates on all the seven layers of OSI model.

Ans to the question no : 8(b)

* What do you mean by Data Terminal Equipment (DTE) & its function?

Ans :

It is any device that is source or destination for binary digital data. At physical layer it can be a terminal computer.

Ans to the question no : 8(c)

* Briefly describe Client Servers Model.

Ans : To process soft records of busi-

Two remote application processes can communicate mainly in two different fashions :

* Peer-to-peer : Both remote processes are executing mainly in two different at same level and they exchange data using some shared resource

* Client - Server Model

One remote process acts as a client and requests some resource from another application process acting as server.

In client-server model, any process can act as server or client. It is not the type of machine, size of the machine or its computing power which makes it server, it is the ability of serving request that makes a machine a server.

Communication :

Two processes in client-server model can interact in various ways:

- * Sockets
- * Remote Procedure calls (RPC)