

## Questions on Chapter 1

### Questions:

**1. Identify the five components of a data communication system.**

Sender: Send information.

Receiver: Receives information.

Message: The information that is transmitted.

Transmission Medium: It is the path that the data goes through, As the cable of the wire, Wi-Fi.

Protocol: It is the system that has the rules. It is standard & known globally on https.

**2. What are the three criteria necessary for effective & efficient network?**

The three criteria are performance, reliability & security.

**3. What are the advantages of a multipoint connection over a point-to-point one?**

Advantages of a multipoint over a point-to-point configuration (type of connection) include ease of installation and low cost.

**4. What are the two types of line configuration?**

Line configuration (or types of connections) are point-to-point and multipoint.

**5. Categorize the four basic topologies in term of line configuration.**

1- Point to point: mesh, star & ring.

2- Multipoint: Bus.

**6. What is the difference between half-duplex and full-duplex transmission modes?**

In half-duplex transmission only one entity can send at a time; in a full-duplex transmission, both entities can send at the same time.

**7. Name the four basic network topologies, and cite an advantage of each type.**

We give an advantage for each of four network topologies:

- a. Mesh: Secure.
- b. Bus: easy installation.
- c. Star: robust
- d. Ring: easy fault isolation.

**8. For n devices in a network, what is the number of cable links required for a mesh, ring, bus and star topology?**

- a. Mesh:  $n(n-1) / 2$
- b. Star: n
- c. Ring n-1
- d. Bus: One backbone and n drop lines.

**9. What are some of the factors that determine whether a communication system is a LAN or WAN?**

The general factors are size distances (Covered by the network), structure, and ownership.

**10. What is an internet? What is the Internet?**

An internet is an interconnection of networks. The Internet is the name of a specific worldwide network.

## Problems:

**P1-3) Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?**

- a) Cable links:  $n(n-1)/2 = (6(6-1))/2 = 15$
- b) Number of ports  $(n-1) = 5$  ports needed per device.

**P1-4) For each of the following four networks, discuss the consequences if a connection fails.**

- a) Five devices arranged in a mesh topology.
- b) Five devices arranged in a star topology (not counting the hub).
- c) Five devices arranged in a bus topology.
- d) Five devices arranged in a ring topology.

Solution:

- a) Mesh topology: If one connection fails, the other connections will still be working
- b) Star topology: The other devices still be able to send data through the hub; there will be no access to the device which has the failed connection to the hub.
- c) Bus Topology: All transmission stops because of signal reflection if the failure is in the bus. If the drop-line fails, only the corresponding device cannot operate.
- d) Ring Topology: The failed connection may disable the whole network unless it is a dual ring or there is a by-pass mechanism

**P1-5) We have two computers connected by an Ethernet hub at home. Is this a LAN or a WAN? Explain the reason.**

This is a LAN. The Ethernet hub creates a LAN.

**P1-6) In the ring topology what happens if one of the stations is unplugged?**

Theoretically, in a ring topology, unplugging one station interrupts the ring. However, most rings networks use a mechanism that bypasses the station; the ring can continue its operation.

**P1-7) In the bus topology what happens if one of the stations in unplugged?**

In a bus topology, no station is in the path of the signal. Unplugging a station has no effect on the operation of the rest of the network.

**P1-8) Performance is inversely related to delay. When we use the internet, which of the following applications are more sensitive to delay?**

- a. Sending an email
- b. Copying a file
- c. Surfing the internet

Solution:

- a. Email is NOT an interactive application. Even if it is delivered immediately. It may stay in the mail-box of the receiver for a while. It is not sensitive to delay.
- b. We normally do not expect a file to be copied immediately. It is not very sensitive to delay.
- c. Surfing the Internet is an application very sensitive to delay. We expect to get access to the site we are searching.

**P1-9) When a party makes a local telephone call to another party, is this a point-to-point or multipoint connection? Explain your answer.**

In this case, the communication is only between caller and the called. A dedicated line is established between them. The connection is point-to-point.

**P1-10) Compare the telephone network and the Internet. What are the similarities? What are the differences?**

The telephone network was originally designed for voice communication; The two networks are similar in the fact that both are made of interconnections of small networks. The telephone network is mostly a circuit-switched network; The Internet is mostly a packet-switched networks.

**MCQ:**

**1) local area network (LAN) is defined by \_\_\_\_\_**

- A) the geometric size of the network
- B) the maximum number of hosts in the network
- C) the maximum number of hosts in the network and/or the geometric size of the network
- D) the topology of the network

Solution: **A**

**2)The largest geographic area a wide area network (WAN) can span is\_\_\_\_\_.**

- A) a town
- B) a state
- C) a country
- D) the world

Solution: **D**

**3) A proposed standard is elevated to \_\_\_\_\_ standard status after at least two successful tries.**

- A) informational
- B) historic
- C) draft
- D)None of the choices are correct

Solution: **C**

**4) Which of the following is not one of the components of a data communication system?**

- A) Message
- B) Sender
- C) Medium
- D) All of the choices are correct

Solution: **D**

**5) Which of the following is not one of the characteristics of a data communication system?**

- A) Delivery
- B) Accuracy
- C) Jitter
- D) All of the choices are correct

**Solution: D**

**6) Data can flow only in one direction all of the times in a \_\_\_\_\_ mode.**

- A) simplex
- B) half-duplex
- C) full-duplex
- D) None of the choices are correct

**Solution: A**

**7) Data can flow only in both direction all of the times in a \_\_\_\_\_ mode.**

- A) simplex
- B) half-duplex
- C) full-duplex
- D) None of the choices are correct

**Solution: C**

**8) Which of the following is not one of the network criteria?**

- A) Performance
- B) Reliability
- C) Security
- D) All of the choices are correct

**Solution: D**

**9) In a \_\_\_\_\_ communication, the media needs to be shared between devices.**

- A) point-to-point
- B) multipoint
- C) mesh
- D) None of the choices are correct

**Solution: B**

**10) In a \_\_\_\_\_ communication, the media is dedicated.**

- A) point-to-point
- B) multipoint
- C) mesh
- D) None of the choices are correct

Solution: **A**

**11) In a fully connected mesh topology with six computers, we need \_\_\_\_\_ links.**

- A) 6
- B) 36
- C) 15
- D) None of the choices are correct

Solution: **C**

**12) In a star topology with six computers, we need \_\_\_\_\_ links.**

- A) 6
- B) 1
- C) 5
- D) None of the choices are correct

Solution: **A**

**13) An RFC is labeled \_\_\_\_\_ if it must be implemented by all Internet systems.**

- A) required
- B) elective
- C) recommended
- D) None of the choices are correct

Solution: **A**