**Data Communications Questions**

**Q1-1.**

Identify the five components of a data communications system.

**Protocol, Sender, Receiver, Message, Medium**

**Q1-2.**

What are the three criteria necessary for an effective and efficient network?

**Performance, Reliability, Security**

**Q1-3.**

What are the advantages of a multipoint connection over a point-to-point connection?

**Cost effectiveness – you need less cabling and hardware ports.**

**Simple Installation – just laying one shared cable is easier than running several cables from one device to another.**

**Efficient Capacity Use – not all devices may need constant communication, sharing a line is more efficient.**

**Q1-4.**

What are the two types of line configuration?

**Point to Point – a dedicated link between two devices.**

**Multipoint – more than two devices share a single link.**

**Q1-5.**

Categorize the four basic topologies in terms of line configuration.

**Ring – A device is connected to two devices on either side of it, in a point to point format. Each device in the ring has a repeater which regenerates the bits and passes them along.**

**Mesh – All devices are connected to eachother, in a point to point format**

**Star – Each device has a point to point link to a central hub/switch.**

**Bus – A shared multipoint link where a single long cable acts as the backbone.**

**Q1-6.**

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

**In both, devices can send and receive. In half-duplex mode, they cannot send and receive at the same time. Like walkie talkies.**

**In full duplex mode, both devices can send and receive simultaneously. Like telephony.**

**Q1-7.**

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

**Bus – Cost effective, requiring the least cabling.**

**Ring – Orderly data transfer, each device has a fair opportunity to transmit data.**

**Star – Easy to manage as you just manage from the central hub/switch.**

**Mesh – Reliable, as if one device is down, traffic can be rerouted through many other existing paths.**

**Q1-8.**

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

**For a mesh, n(n-1) / 2**

**For a ring, n**

**For a star, n**

**For a bus, 1 backbone and n drop lines**

**Q1-9.**

What are some of the factors that determine whether a communications system is a LAN or WAN?

**Geographical region. A LAN is a small space, WAN is a wide space.**

**Ownership and Management. While a LAN is typically managed by a private organization, WANs can involve multiple parties, usually managed by ISPs.**

**Q1-10.**

What is an internet? What is the Internet?

**An internet(work) is the connection of two or more networks. The Internet is the largest internet(work) ever built. Composed of thousands of interconnected networks.**

**Q1-11.**

Why are protocols needed?

**Q1-12.**

In a LAN with a link-layer switch (Figure 1.8b), host 1 wants to send a message to host 3. Because communication is through the link-layer switch, does the switch need to have an address? Explain.

**Q1-13.**

How many point-to-point WANs are needed to connect n LANs if each LAN should be able to directly communicate with any other LAN?

**Q1-14.**

When a resident uses a dial-up or DLS service to connect to the Internet, what is the role of the telephone company?

**Q1-15.**

What is the first principle we discussed in this chapter for protocol layering that needs to be followed to make the communication bidirectional?

**Q1-16.**

Which layers of the TCP/IP protocol suite are involved in a link-layer switch?

**Q1-17.**

A router connects three links (networks). How many of each of the following layers can the router be involved with?  
a. physical layer  
b. data-link layer  
c. network layer

**Q1-18.**

In the TCP/IP protocol suite, what are the identical objects at the sender and the receiver sites when we think about the logical connection at the application layer?

**Q1-19.**

A host communicates with another host using the TCP/IP protocol suite. What is the unit of data sent or received at each of the following layers?  
a. application layer  
b. network layer  
c. data-link layer

**Q1-20.**

Which of the following data units is encapsulated in a frame?  
a. a user datagram  
b. a datagram  
c. a segment

**Q1-21.**

Which of the following data units has an application-layer message plus the header from layer 4?  
a. a frame  
b. a user datagram  
c. a bit

**Q1-22.**

List some application-layer protocols mentioned in this chapter.

**Q1-23.**

If a port number is 16 bits (2 bytes), what is the minimum header size at the transport layer of the TCP/IP protocol suite?

**Q1-24.**

What are the types of addresses (identifiers) used in each of the following layers?  
a. application layer  
b. network layer  
c. data-link layer

**Q1-25.**

Assume we want to connect two isolated hosts together to let each host communicate with the other. Do we need a link-layer switch between the two? Explain.

**Q1-26.**

If there is a single path between the source host and the destination host, do we need a router between the two hosts?