Chapter 2: Network Topology

TRUE/FALSE

1. The network cloud may comprise only the network found in a small laboratory, or it may represent an entire wide area network (WAN) such as the Internet.

   ANS: T PTS: 1 REF: 22

2. With certain types of network communications, it is possible that duplicate packets of data are generated if an acknowledgement is not received by the source computer.

   ANS: T PTS: 1 REF: 23

3. In a fully connected network, the number of connections at each node equals the total number of nodes plus one.

   ANS: F PTS: 1 REF: 25

4. Even if the encrypted traffic is intercepted, chances are very small that the contents can be decrypted if a suitably strong encryption method and key are used.

   ANS: T PTS: 1 REF: 31

5. A network that can be partitioned is secure and reliable.

   ANS: F PTS: 1 REF: 31

MULTIPLE CHOICE

1. The connections for the ____ of a network may be provided through dedicated phone lines, twisted pair cable, fiber optic cable line-of-sight microwave RF, ATM, or other form of electronic connection.
   a. physical topology
   b. virtual topology
   c. physical infrastructure
   d. virtual interconnection

   ANS: A PTS: 1 REF: 22

2. When a large amount of data must be sent between machines on a network, it is possible to set up a ____ between the machines.
   a. permanent circuit
   b. virtual circuit
   c. virtual interface
   d. physical interface

   ANS: B PTS: 1 REF: 23

3. A ____ uses public network connections to establish private communication by encrypting the data transmitted between the two computers at each end of the connection.
   a. NPV
   b. VN
   c. PVN
   d. VPN

   ANS: D PTS: 1 REF: 23-24

4. Seven fully connected nodes require ____ links.
   a. 14
   c. 28

b. 21 d. 35

ANS: B PTS: 1 REF: 25

5. A ____ network uses a single shared common communication media that all nodes tap into.
   a. ring c. bus
   b. star d. string

   ANS: C PTS: 1 REF: 26

6. In a bus network, if two or more nodes transmit data at the same time, a ____ occurs.
   a. collision c. collusion
   b. compression d. contention

   ANS: A PTS: 1 REF: 26

7. Token-ring networks, although logically viewed as rings, are connected using central ____.
   a. media access units c. station access units
   b. multistation access units d. access units

   ANS: B PTS: 1 REF: 27

8. A(n) ____ is a 32-bit number used to locate and identify nodes on the Internet.
   a. MAC address c. Ethernet address
   b. TCP address d. IP address

   ANS: D PTS: 1 REF: 29

9. A ____ is a portion of a network.
   a. subnet c. slice
   b. subunit d. subdivision

   ANS: A PTS: 1 REF: 29

10. Companies that connect to a NAP enter into ____ agreements with each other that allow them to exchange traffic.
    a. posting c. peering
    b. partner d. polling

    ANS: C PTS: 1 REF: 30

COMPLETION

1. A(n) _____ circuit is a prearranged path through the network that all packets will travel for a particular session between machines.

   ANS: virtual

   PTS: 1 REF: 23

2. In a star network, all nodes connect to a central communications _____.

   ANS: hub

   PTS: 1 REF: 25

3. _____ is a logical, not physical, activity and is accomplished using a special subnet mask, such as 255.255.255.192.

   ANS: Subnetting

   PTS: 1 REF: 29

4. A(n) _____ network is owned and managed by a private organization or company and may have a much larger bandwidth capability than a public network.

   ANS: private

   PTS: 1 REF: 30

5. In terms of security and reliability, we must concern ourselves with what is required to _____ our network.

   ANS: partition

   PTS: 1 REF: 31

MATCHING

Match each item with the correct statement below.

a. Tunnels
b. Topology
c. Logical topology
d. NAPs
e. Cloud

1. Concerns the structure of the connections between the computers in a network
2. A graphical symbol used to describe a network without specifying the nature of the connections
3. Has to do with the path a packet of data takes through the network
4. Logical connections between the nodes of the VPN
5. Provide access to national and global network traffic

1. ANS: B PTS: 1 REF: 22
2. ANS: E PTS: 1 REF: 22
3. ANS: C PTS: 1 REF: 22
4. ANS: A PTS: 1 REF: 24
5. ANS: D PTS: 1 REF: 29

SHORT ANSWER

1. Describe a mesh network.

   ANS:
   In general, a mesh network is a collection of computers that are not connected in a bus, star, or ring topology. The term full mesh, or fully connected mesh, is only used when each node is connected to each other node. A partially connected network does not have as many links as a full mesh, making it less reliable.

   PTS: 1 REF: 25

2. Discuss the difference between a hub and a switch.

   ANS:
   One characteristic of a hub is that it broadcasts data received on one port to all other ports, essentially sending copies of data from one node to all other nodes on the LAN. In this way, each node on the network has an opportunity to see each packet of network data. A similar device called a switch learns where to send the data, eliminating a large majority of the broadcast traffic on the LAN. The switch also provides the Star topology.

   PTS: 1 REF: 26

3. Describe a hybrid network.

   ANS:
   A hybrid network combines the components of two or more network topologies. Two star networks are connected (with three additional nodes) via a bus. This used to be a common way to implement Ethernet, with coax running between classrooms or laboratories and hubs in each room to form small subnetworks. Putting together a hybrid network takes careful planning, for there are various rules that dictate how the individual components may be connected and used. For example, when connecting Ethernet segments, a maximum of four repeaters may be used with five segments. Furthermore, if a 4-Mbps token-ring network is interfaced with a 10-Mbps Ethernet network, there are performance issues that must also be taken into consideration (because any Ethernet traffic is slowed down to 4Mbps on the token-ring side). In addition, the overall organization of the hybrid network, from a logical viewpoint, must be planned out as well.

   PTS: 1 REF: 27

4. Discuss subnetting.

   ANS:
   Subnetting is a logical, not physical, activity and is accomplished using a special subnet mask, such as 255.255.255.192, that is logically ANDed with an IP address to determine its network address. The subnet mask is used to separate the IP address into two components: the network portion of the address and the host portion of the address. Here the host represents a node on the network. Nodes on different logical subnets cannot talk to each other without the use of a router, so using subnets allows the network designer to manage network traffic in a straightforward manner.

   PTS: 1 REF: 29

5. Describe a private network.

   ANS:
   A private network is owned and managed by a private organization or company and may have a much larger bandwidth capability than a public network, depending on how much money its parent company invests in network infrastructure (by installing its own media between sites or by leasing private, dedicated communication lines from the telephone company). Private networks have higher maintenance costs per user and have the capability of restricting access to sensitive data.

   PTS: 1 REF: 30-31