Chapter 4 – Network Access
Study Guide

Tips for success: While answering the questions read Chapter 4, review the summary, and complete the practice Quiz.

After completion of this chapter, you should be able to:

- Explain how physical layer protocols and services support communications across data networks.
- Build a simple network using the appropriate.
- Explain the role of the data link layer in supporting communications across data networks.
- Compare media access control techniques and logical topologies used in networks.

1. Explain the encapsulation as it relates to the data link layer, specifically how the frame is formed: It forms the data link of the network and system using series of various links.

2. Define the following terms:
   a. EMI – is disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation
   b. Crosstalk – unwanted transfer of signals between communication channels
   c. Encoding – convert into a coded form
   d. Signaling – transmit information or instructions
   e. Throughput – the amount of material or items passing through a system or process

3. What is the formula used to find Goodput (hint: 4.1.3.3)?

\[
\text{Goodput} = \frac{\text{recvSize}}{(\text{stopTime} - \text{startTime})} \times \frac{8}{1000}
\]

4. What is the wiring order for the EIA/TIA 568B standard?

\[
\text{o/w/o/g/w/b/l/w/b/r/w/b/r/n}
\]

5. Why is it important to twist the wire pairs in a UTP cable?

   For the crosstalk to work

6. When are the following cable types used:
   a. Straight-through – is used in local area networks to connect a computer to a network hub such as a router
   b. Crossover – connect computing devices together directly
c. Rollover – a type of null-modem cable that is often used to connect a computer terminal to a router's console port

7. Compare and Contrast Single Mode and Multimode Fiber:

<table>
<thead>
<tr>
<th>Single Mode Fiber</th>
<th>Multimode Fiber</th>
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<tbody>
<tr>
<td>Designed to carry light only directly down the fibre - the transverse mode</td>
<td>mostly used for communication over short distances, such as within a building or on a campus. Typical multimode links have data rates of 10 Mbit/s to 10 Gbit/s over link lengths of up to 600 meters</td>
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8. Describe the 802.11ac standard: providing high-throughput wireless local area networks (WLANs) on the 5 GHz band

9. How does CSMA/CA work in a wireless network?

acts to prevent collisions before they happen

10. Explain the sublayers of the OSI model Data Link layer:
They are different steps in the networking process

11. Which topology provides high availability, but can be very costly? CAT6

12. What is the difference between Half-duplex communication and Full-duplex communication? full-duplex is used to describe communication where both sides are able to send and receive data at the same time.

Half-duplex is used to describe communication where only... one side can talk at a time. Once one side has finished transmitting its data, the other side can respond.

13. What happens to a frame when it is destined for a network outside of its LAN?
Its slower, but easier

14. What is the purpose of the FCS field in a Frame? to determine if errors occurred in the transmission and reception

15. Complete Activity 4.1.3.5 – Physical Layer Terminology

16. Complete Activity 4.2.2.6 – Cable Pinouts

17. Complete Activity 4.2.3.7 – Fiber-optics Terminology

18. Complete Activity 4.3.2.3 – Generic Frame Fields
19. Complete Activity 4.4.4.9 – Frame Fields