CHAPTER 14

Local Area Networks: Ethernet

Review Questions

1. The preamble is a 56-bit field that provides an alert and timing pulse. It is added to the frame at the physical layer and is nor formally part of the frame.
2. An NIC provides an Ethernet station with a 6-byte physical address. Most of the physical and data-link layer duties are done by the NIC.
3. The transceiver transmits signals over the medium, receives signals over the medium, and detects collisions.
4. A multicast address identifies a group of stations; a broadcast address identifies all stations on the network.
5. A bridge can raise the bandwidth and separate collision domains.
6. A layer-2 switch is an N-port bridge with additional sophistication that allows faster handling of packets.
7. In a full-duplex switched Ethernet LAN, each station can send data without the need to sense the line.
8. Traditional Ethernet: 10 Mbps
   Fast Ethernet: 100 Mbps
   Gigabit Ethernet: 1000 Mbps
9. The common traditional Ethernet implementations are 10Base5, 10Base2, 10-Base-T, and 10Base-FL.
10. The common Fast Ethernet implementations are 100Base-TX, 100Base-FX, and 100Base-T4.
11. Gigabit Ethernet implementations are 1000Base-SX, 1000Base-LX, and 1000Base-T.
12. Autonegotiation is a Fast Ethernet feature that allows two devices to negotiate the mode or data rate of operation.

13. The reconciliation sublayer in Fast Ethernet replaces the PLS sublayer in traditional Ethernet. It handles all the PLS sublayer tasks except for encoding and decoding.
14. The GMII in Gigabit Ethernet is a specification that defines how the reconciliation sublayer is to be connected to the PHY layer (transceiver).
15. The physical and data link layers are of concern to LANs.

Multiple-Choice Questions

16. d
17. b
18. a
19. d
20. a
21. c
22. c
23. a
24. c
25. d
26. d
27. b (almost 72 percent) not counting preamble and SFD field (less if included)
28. d
29. d

Exercises

30. (64 + 1518) /2 = 791 bytes
31. Smallest: 46/64 = 71.87% Largest: 1500/1518 = 98.81% Average = 85.34%
32. The Ethernet frame must have a minimum data size because a sending station must be able to sense a collision before the entire frame is sent.
33. 2500 meters / 200,000,000 mps = 12.5 microseconds.
34. The minimum frame size is 64 bytes.
    64 bytes × 8 bits / byte = 512 bits.
    If the data rate is 10 Mbps, 512 bits can be generated in:
    512 bits / 10,000,000 bits/second = 51.2 microseconds
35. 46 - 42 = 4
36. No. It is sent in two frames. Normally the system sends the maximum number of bytes that can be sent. This means that the first frame is sent with 1500 bytes and 10 bytes are sent in the next frame:
    Frame 1: 1500 bytes
    Frame 2: 10 byte of data + 36 bytes of padding

37. See Table 14.1.

Table 14.1 *Exercise 37*

Characteristics	*10Base5*	*10Base2*	*10Base-T*	*10Base-FL*
Type of cable	thick coaxial	thin coaxial	twisted pair	fiber optic
Type of transceiver	external	both	both	external
Need for cable end	yes	yes	no	no

38. See Table 14.2.

Table 14.2 *Exercise 38*

Sublayers	*Fast Ethernet*	*Gigabit Ethernet*
Reconciliation	Yes	Yes
MII	Yes	No
GMII	No	Yes
PHY	Yes	Yes
MDI	Yes	Yes

39. See Table 14.3.

Table 14.3 *Exercise 39*

Implementation	*Media*	*Encoding Methods*
100BASE-TX	Two pair UTP or STP	4B/5B and MLT-3
100BASE-FX	Two pairs fiber optic cables	4B/5B and NRZ-I
100BASE-T4	Four pairs of UTP	8B/6T

40. See Table 14.4.

Table 14.4 *Exercise 40*

Implementation	*Media*	*Encoding Methods*
1000BASE-SX	Two fiber optic cables	8B/10B and NRZ
1000BASE-LX	Two fiber optic cables	8B/10B and NRZ
1000BASE-CX	Two pairs of STP	8B/10B and NRZ
1000BASE-T	Four pairs of UTP	4D-PAM5