CHAPTER 18

Frame Relay

18.1 REVIEW QUESTIONS

1. Flow control is handled through the backward explicit congestion notification (BECN) bit and the forward explicit congestion notification (FECN) bit.
3. Higher speed; operates only in physical and data link layer, which makes it easier to use protocols that already have a network layer protocol; allows bursty data; variable frame size up to 9000 bytes; less expensive.
5. See Table 18.1. The control field is missing in the Frame Relay because flow and error control are left to upper layers.

Table 18.1

Fields	*HDLC*	*Frame Relay*
Flag	X	X
Address	X	X
Control	X	
Information	X	X
FCS	X	X

7. I-frame
9. Frame Relay does not use flow and error control, which means it does not use the sliding window protocol. Therefore, there is no need for sequence numbers.
11. T-lines provide point-to-point connections, not many-to-many. In order to connect several LANs together using T-lines, we need a mesh with many lines. Using Frame Relay we need only one line for each LAN to get connected to the Frame Relay network.
13. Frame Relay is a variable-length packet switched network. This type of network can create variable-size delays which is unsuitable for real-time communication.

15. Frame Relay does not define a specific protocol for the physical layer. Any protocol recognized by ANSI is acceptable.
17. The BECN bit warns the sender of congestion in the network through switches that either use response frames from the receiver or that use a predefined connection to send special frames for this specific purpose.
19. Frame Relay uses the leaky bucket method. The average data rate should be fixed, but the user can send bursty data.
21. The EA bit indicates the status of the current byte. An EA set to 1 means the current byte is the last one of the address, while an EA set to 0 means another address byte is to follow.

18.2 MULTIPLE CHOICE QUESTIONS

23. c 25. b 27. b 29. c 31. a 33. c 35. b 37. b 39. c 41. d
43. c 45. c 47. b

18.3 EXERCISES

49. BECN bit set. Congestion in the backward direction, but no congestion in the forward direction
51. Not valid, there is only 15 bits instead of 16 bits
53. 2C 21
55. BECN bit set. FECN bit not set.
57. 20 gallons
59.
    a. Access rate: 1.544 Mbps
    b. No
    c. Yes
    d. Yes. But frames may be discarded if there is congestion.
    e. Some of the frames would be discarded.
    f. 1 Mbps
    g. 1.2 Mbps
61. See Figure 18.1.

Figure 18.1 *Exercise 61*