1.P1

Assume the port of A is 300, B is 301, and as we known telnet uses port 23:

a. 300 -> 23

b. 301 -> 23

c. 23 -> 300

d. 23 -> 301

e. Yes, they could be the same

f. No, they can't use the same port at the same time

2.P3

01010011 + 01100110 + 01110100 = 00101110

complemental code = 11010001

Because in order to detect errors, it will add the three byte and the complemental code of their sum, which if there exist a zero, it must exist an error.

one bit errors will not be missed in this kind of detect, however, two bit errors could be missed, for instance, the last bit of the first byte turns to 0 and the last bit of the second byte turns to 1. When two bits are swarped, it can't be detect.

3.P15

$t_{trans} = \frac{L}{R} = \frac{1500bit/pkt}{10^9 bit/s} = 12\mu s/pkt$

$U_{sender} = \frac{\frac{L}{R} \times length}{RTT + \frac{L}{R}} = \frac{0.012 \times length}{30.012} = 0.9$

$length = 2250.9 \approx 2251$

4.P28

Host A starts sending data at the rate of 100 Mbps because the link capacity is 100 Mbps, though host A can send data at the rate of 120 Mbps.

Host B receives data at the rate of 50 Mbps, thus after some time, the buffer of host B will be filled up. Then host B will signal host A to stop sending data, which will set the rwnd to zero.

Host A then stops sending data until it receives a segment with rwnd > 0. It finally turn to be sending data alternately according to the value of rwnd received from host B.

5.P40

a. [1, 6] and [23, 26].

b. [6, 16] and [17, 22].

c. Because the cwnd size not dropped to 1, it is recognized by 3 duplicate ACK.

d. Because the cwnd size dropped to 1, it is recognized by timeout.

e. 32, since it is the cwnd size when the slow start stops.

f. At 16 the cwnd size is 42, then packet loss detected, so the ssthresh value is half of the origin, which turns to be 21.

g. At 22 the cwnd size is 29, then packet loss detected, so the ssthresh value is half of the origin, which turns to be 14.

h. 1 + 2 + 4 + 8 + 16 + 32 = 63 < 70, 63 + 32 = 95 > 70, so it is at the 7th round.

i. 4 + 3 =7 and 4

j. 21 and 1

k. 1 + 2 + 4 + 8 + 16 + 21 = 52