Quickies
1. In CDMA, stations use different codes to transmit. In DS-CDMA, each station uses a different code but uses the entire bandwidth to transmit. The code sequence is used to change the data. In FH-CDMA, the sender uses a set of frequencies to transmit the data. The receiver needs to know the hoping sequence to decode the data.
2. In 1-persistent CSMA, a host continues to sense the channel until it becomes idle and transmits. In non-persistent CSMA, if the channel is busy, a host randomly reschedules the sensing. If the channel is idle, it transmits.
3. In parity based error detection, a bit is added to a bit string so that the number of 1s is either even or odd. If due to error, any of the bits are changed (atmost one), it can be detected. In CRC, a polynomial is used to add additional bits to detect multiple bit errors.
4. A fixed subnet mask allows the number of subnets to be a power of 2. Variable length subnetting allows more than one mask to be specified so that the number of subnets can be arbitrary. Multiple masks are applied to further subdivide the network to give flexibility in the number of subnets.
5. Go back N strategy is suited for a link with burst errors. When a link exhibits burst errors, it is likely that a sequence of packets is lost. Hence Go back N strategy allows for retransmission of all the packets since the first error.

Encoding
a) 110101111100101111101010111110110
b) 100100001

Message switching
Total time to transfer a message to the router is 10 K /1000 KBps (0.01 sec) + 0.01 sec (.02 sec) From router to the end host another 0.02 sec. Total time is .04 sec

Packet switching
Time to transfer entire file 100 K /1000 KBps (0.01 sec) + 0.02 sec of propagation delay which is .03 sec.

Subnetting
4.5.6.7 Class A
229.1.2.3 Class D
191.1.2.3 Class B

Number of subnets = 4; Subnet 1: 180.25.00.00 to 180.25.63.255
Subnet 2: 180.25.64.00 to 180.25.127.255
Subnet 3: 180.25.128.00 to 180.25.191.255
Subnet 4: 180.25.192.00 to 180.25.255.255

If the address is class A, number of bits for subnet is 11, number of subnets is 2048.
If the address is class B, the number of bits for subnet is 3, number of subnets is 8

Goback N
1 RTT : Frames 1 -8
Ack received : Ack(3)
2 RTT: Frames 3 – 10
Ack received: Ack (11)
Next (1/2) RTT: Frames 11 – 16 sent
So 2.5 RTT to send 16 frames

Selective repeat
1 RTT: Frames 1-8
  Ack received: Ack (3)
2 RTT: Frames 3, 9, 10
  Ack received: Ack (11)
Next (1/2) RTT: Frames 11-16 sent
  So 2.5 RTT

This result is due to the B/W being infinite and there is no cost for retransmitting the entire set of frames after frame 3 for Gokack N.