Problem 1

1 1 1 0 1

0 1 1 0 0

1 0 0 1 0

1 1 0 1 1

1 1 0 0 0

Problem 5

0100

Problem 6

0000

1111

1001

Problem 7

a) Without loss of generality, suppose ith bit is flipped, where 0<= i <= d+r-1 and assume that the least significant bit is 0th bit.

A single bit error means that the received data is K=D\*2r XOR R + 2i. It is clear that if we divide K by G, then the reminder is not zero. In general, if G contains at least two 1’s, then a single bit error can always be detected.

b) The key insight here is that G can be divided by 11 (binary number), but any number of odd-number of 1’s cannot be divided by 11. Thus, a sequence (not necessarily contiguous) of odd-number bit errors cannot be divided by 11, thus it cannot be divided by G.

Problem 18

At 0 = t A transmits. At 576 = t , A would finish transmitting. In the worst case, B

begins transmitting at time t=324, which is the time right before the first bit of A’s frame

arrives at B. At time t=324+325=649 B 's first bit arrives at A . Because 649> 576, A

finishes transmitting before it detects that B has transmitted. So A incorrectly thinks that

its frame was successfully transmitted without a collision.