1. Which of the following is not false regarding cyclic redundancy check (CRC)?

[MSQ]

A CRC is an error correction method

B CRC is an error detection method.

C CRC is an error correction & detection method.

D CRC is based on binary division.

2. **Dataword** = d(x) **Codeword** = c(x) **Generator** = g(x)
Syndrome = s(x) **Error** = e(x)

Which of the following statements is/are true? **[MSQ]**

A If S(x) ≠ 0 then code word is rejected and CRC scheme is working fine.

B CRC is not a perfect scheme if e(x) is divisible by g(x) then that error can't be detected.

C If S(x) = 0 and e(x) ≠ 0 [e(x) is divisible by g(x)], then code word is accepted and CRC scheme failed to detect error.

D If S(x) = 0 and e(x) = 0, then code word is accepted and CRC scheme is working fine.

3. Assume that a **12-bit hamming** codeword consisting of **8-bit data** = **1100010x** and check bits = **00y0**, what are the values of x and y if data is encoded using **even parity**?

[MSQ]

A X = 0, Y = 0

B X = 0, Y = 1

C X = 1, Y = 1

D X = 1, Y = 0

4. Assume that in stop and wait protocol the probability of frame being lost is N then what will be mean number of transmission of a frame?

[MSQ]

A 1/N

B 1/N-1

C 1/1-N

D N

5. Which of the following statement(s) is/are correct about Go-Back-N-ARQ?

[MSQ]

A In Go-Back-N-ARQ if the maximum sequence number is K then sender window size will be K.

B Go-Back-N-ARQ uses cumulative acknowledgment.

C In Go-Back-N-ARQ time out timer is maintained only for the first frame of the window.

D None of the above

6. A 3000 km long trunk is used to transmit frames using Go-Back-N protocol. The propagation speed is 6 microsec/km and trunk data rate is 1.544 Mbps. The ack time is not considered. Frame size of 64 bytes.

What is the minimum (corrected to maximum) number of bits of sequence number? Also, calculate the maximum window size at the sender side if 100% efficiency needs to be achieved?

[NAT]

7. In selective repeat ARQ, packet size is 2000 bytes, transmission time for one packet is 1ms. If distance between hosts is 10 km and signal speed is 4000km/sec and frame sequence number is 6 bits long in frame format, then the throughput (in Mbps) is ____ (up to two decimal places).

[NAT]

8. The distance between two stations M and N is L kilometers. All frames are K bits long. The propagation delay per kilometer is t seconds. Let R bits/second be the channel capacity. Assuming that processing delay is negligible, the minimum number of bits for the sequence number field in a frame for maximum utilization, when the sliding window protocol is used:

[NAT]

9. The distance between two stations M and N is L kilometers. All frames are K bits long. The propagation delay per kilometer is t seconds. Let R bits/second be the channel capacity. Assuming that processing delay is negligible, the minimum number of bits for the sequence number field in a frame for maximum utilization, when the sliding window protocol is used:

[NAT]

10. Frames of 1000 bits are sent over a 10^6 bps duplex link between two hosts. The propagation time is 25ms. Frames are to be transmitted into this link to maximally pack them in transit (within the link). What is the minimum number of bits (n) that will be required to represent the sequence numbers distinctly? Assume that no time gap needs to be given between transmission of two frames.

[MCQ]

A) n = 2

B) n = 3

C) n = 5

D) n = 6