

**Assignment III CSE -311 Computer communication Networks Date: 25-09-2014**

**Each question carry two marks (duration 10 minutes)**

1. For  $P = 110011$  and  $M = 11100011$  find the CRC using modulo 2 arithmetic.
2. Suppose a file of 10,000 bytes is to be sent over a line at 2400bps.
  - a. Calculate the overhead in bits and time in using asynchronous communication. Assume one start bit and a stop element of length one bit, and 8 bits to send the byte itself for each character. The 8-bit character consists of all data bits with no parity bit.
  - b. Calculate the overhead in bits and time using synchronous communication. Assume that the data are sent in frames. Each frame consists of 1000 characters = 8000 bits and an overhead of 48 control bits per frame.
3. Consider a half-duplex point-to-point link using a stop-and-wait scheme, in which a series of messages is sent, with each message segmented into a number of frames. Ignore errors & frame overhead.
  - a) What is the effect on the line utilization of increasing the message size so that fewer messages will be required? Other factors remain constant.
  - b) What is the effect on the line utilization of increasing the number of frames for a constant message size?
  - c) What is the effect on the line utilization of increasing frame size?
4. Consider the use of 1000-bit frames on a 1-Mbps satellite channel with a 270-ms delay from sender to receiver (receiver to sender). What is the maximum link utilization for
  - a) Stop and wait protocol?
  - b) Continuous flow control with a window size of 7?
  - c) Continuous flow control with a window size of 255?
5. Two neighboring nodes (A and B) use a sliding-window protocol with a 2-bit sequence number. As the ARQ mechanism, go back-N is used with a window size of 4. Assuming A is transmitting and B is receiving, show the window positions for the following succession of events.
  - a) Before A sends any frames;
  - b) After A sends frames 0, 1 and receives acknowledgement from B for 0;
  - c) After A sends frames 2 and 3 and B acknowledges 3 and the ACK is received by A.