Assignment 3

Due Thursday, December 7. Show your work. Submit your assignment using the appropriate dropbox on the course web site. Assignments submitted after the solutions are made available will be given a mark of zero.

Question 1

When no data is being transmitted over a 100 Mb/s Ethernet connection the 4B5B Idle symbol (I) is continuously transmitted. As usual, this symbol is encoded using MLT-3. Draw the resulting waveform.

Question 2

A channel has an excess bandwidth parameter (α) of 0.33. The gain of the channel is zero ($-\infty$ dB) at a frequency of 60 MHz. At what symbol rate(s) would there would be no ISI?

Question 3

A bit rate of 2 Mb/s is transmitted over a BSC. The channel has a capacity of 1 Mb/s. What is the BER?

Question 4

What is the remainder (as a polynomial) after dividing the polynomial x^6+1 by x^2+1? Assume the coefficients are from GF(2). As usual, show your work.

Question 5

A 100 Mb/s Ethernet switch has 8 ports. Packets are continuously being received on each port. What is the total throughput through the switch (in Mb/s) if:

(a) the destinations of the packets are equally divided among the 8 ports, and

(b) the destination of every packet is the same (e.g. a gateway connected to one of the ports).

Ignore all overhead and buffer overflows.