ITEC 650
Homework 2 (10 points)
Solutions

Name:

CRC (Cyclic Redundancy Check) Code = Polynomial Code

Suppose that

(1) k = 5, n-k = 3,
(2) Generator polynomial: $g(x) = x^3 + x + 1$
(3) Information: (1,1,0,0,1)

1. **(2 points) What is the polynomial representation of the binary information vector (1,1,0,0,1) ?**
   $i(x) = x^4 + x^3 + 1$

2. **(8 points) What is the transmitted codeword? You must show the intermediate calculation which leads you to the solution. Show the transmitted codeword in a polynomial representation and a binary vector representation.**
   1) n-k = 3, implies multiply i(x) by x^3 to get: $i(x)x^{n-k} = x^3(x^4 + x^3 + 1) = x^7 + x^6 + x^3$
   2) We're given generator polynomial $g(x) = x^3 + x + 1$; Divide it into $i(x)x^{n-k}$

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x^4 + x^3 + x^2 + 1 \qquad\qquad\qquad\