

***KFUPM - COMPUTER ENGINEERING DEPARTMENT*****COE-341 – Data and Computer Communication****Quiz 05 - May 10<sup>th</sup>, 2010      Take home quiz****Due on Sat May 15<sup>th</sup>, 2010 (class time)****Student Name:****Student Number:**

---

---

**1) (10 points)** Similar to the example solved in class (Problem 6.5 textbook page 205). Assume that the number of data bits is 12 bits and we still need one start bit, one parity bit, and two stop elements (bits). If the reference clock speed (generating the data) is referred to by  $f_{\text{bit}}$ .

a) Compute the speed of the slowest clock,  $f_{\text{slow}}$ , that would not make an error in sampling the data bit in the middle.

b) Compute the speed of the fastest clock,  $f_{\text{fast}}$ , that would not make an error in sampling the data bit in the middle.

**2) (20 points)** Using the CRC-CCITT polynomial (refer to listing in class notes or textbook page 193), generate the 16-bit CRC code for a message consisting of a one followed by 15 zeros.

- a) Use the long division method.
- b) Use the shift register structure shown in Figure 6.6.
- c) Show that  $X^n M(X) = P(X)Q(X) + R(X)$ .