KFUPM - COMPUTER ENGINEERING DEPARTMENT

COE-540 – Computer Networks
Quiz 02 – Due March 22nd, 2011 – Take home quiz

Student Name:
Student Number:

Problem: It is desired to DESIGN a communication link from Qaurayyat (A) to Riyadh (B) and from Riyadh (B) to Dammam (C). The figure below shows three nodes: A, B, and C connected using two links. If links AB and BC both operate sliding window control protocols with $W = 7$.

a) (100 point) What is the maximum data rate, R_AB, for link Qurayyat-Dammam such that the receive buffer at Riyadh node does NOT overflow.

Assume: all links operate full-duplex lines and error free channels. Furthermore, ACK frames are separate frames of 100 bits in length and the processing time for data or acknowledgment frames require 0.5 milliseconds each.

b) (50 point) Repeat the problem assuming the link bit rate from Riyadh to Dammam is 400 kb/s.

```
        d = 1000 km              d = 500 km
       Tprop = 5 µsec/km        Tprop = 5 µsec/km
        Frame = 500 bit          Frame = 500 bit
            W = 7                    W = 7
          R = ? b/s              R = 200 kb/s


   ( A )-----------------( B )-----------------( C )
```