2007 Paper 9 Question 4

Digital Communication II

(*a*) Many distributed algorithms for sharing resources on the time scale of a round-trip time exist.

    (*i*) Describe the p-persistent CSMA/CD algorithm used on Ethernets to manage capacity and contention for a shared resource. [5 marks]

    (*ii*) Describe a difference from (*i*) arising from the hidden- and exposed-terminal problems in shared-media wireless media networks, and how this leads to CSMA/CA. [5 marks]

(*b*) Discuss how the use of TCP's congestion avoidance and control algorithm can be seen as similar to the contention schemes used in Ethernets (wired or wireless). [5 marks]

(*c*) What is the key parameter distinguishing between CSMA/CD and TCP, and why does this make a difference in the different schemes for avoiding congestion and contention on shared media? [5 marks]