Score:_____ Name:_____

ECE 3055 Quiz 8 - July 17, 2002

1.(*3 pts.*) A 32-bit 133Mhz PCI bus needs to transfer 128 bits of data stored in sequential addresses (i.e. a PCI burst). PCI uses a multiplexed address and data bus. Assume the address is 32-bits. The starting address transfer requires the first clock cycle and it can transfer data from consecutive addresses on each subsequent clock with no additional address transfers required. Compute the maximum I/O bandwidth in megabytes per second on the 128-bit PCI burst. takes 5 clocks

128/8 = 16 bytes

A $D_1 D_2 D_3 D_4$

$(133 \times 10^6/5) \times 16$

PCI I/O bandwidth for a 128-bit burst 425.6 (in MB/sec – M is 10^6 here, not 2^{20})

2. (*3 pts.*) Other than a fast processor with lots of memory, a disk with DMA, and an interrupt structure, list the three most important additional hardware features needed to support a modern "secure" multiprogramming operating system. Do not include network security.

A. I/O protection - mode bit priviledged instrutions

B. Memory protection - base & limit registers / virtual memory

C. CPU protection - time slice interrupt

3. (*2 pts.*) In a multiprogramming OS, what would stop a process with an infinite loop?

A time slice interrupt

4. (*1 pt.*) How does a process perform I/O in a multiprogramming OS?

It must make API (System) calls to the OS since I/O instructions are priviledged (mode bit)

5. (*1pt.*) The memory resident portion of the Operating system is called

the Kernal.