MC78 Final Exam

Serial #:

This exam is an open-book, open-notes, individual-work exam. Please write your name only on this page. Do not turn the page until instructed, in order that everyone may have the same time. Then, be sure to look at all problems before deciding which one to do first. Some problems are easier than others, so plan your time accordingly. You have 120 minutes to work.

Write the answer to each problem on the page on which that problem appears. You may use the back of that same sheet if you need additional space. You may also request additional paper.

Name: ______________________________

Problem	Page	Possible	Score
1	2	12	
2	3	12	
3	4	12	
4	5	12	
Total		48	

1. [**12 Points**] Why would a real-time clock I/O device (i.e., one that reports the current date and time) be unlikely to use DMA?

2. [**12 Points**] The HP 97560 disk drive has a seek time in milliseconds for a distance of d tracks that is approximately given by $3.24 + 0.400\sqrt{d}$ for $d < 383$, and by $8.00 + 0.008d$ for $d \geq 383$. Suppose the head is currently on track 100, and there are requests for tracks 500 and 0, which arrived in that order. How much time will the drive spend seeking if the operating system serves these requests using a SSTF schedule? A FCFS schedule? Can you give an answer for LOOK without more information? Why or why not?

3. [**12 Points**] Unix has a system call for acquiring or releasing a lock associated with a file, in order to guard accesses to that file. In the Andrew File System (AFS), the semantics of this system call have been modified slightly. Specifically, if a process acquires a file lock and doesn't release it within 30 minutes, the system forcibly revokes the lock from the process. What are the advantages and disadvantages of this modification? Why is it more advantageous for AFS than it would be for a standard Unix file system?

4. [**12 Points**] Of the two security papers we read (and students presented), which do you think will have a greater impact on the security of the world's computing systems in the next few years? Justify your answer, commenting on both papers in your justification.