1. (5 points) Circle the correct answer among the choices given. If you circle more than one answer, you will lose the grade of the corresponding question.

(A) For the following context switches, which one is the slowest?
   1. user-level threads of the same process
   2. kernel-level threads of the same process
   3. context switch from a process to another process
   4. They all have the same speed.

(B) In a computer system with a single CPU and we do not know the runtime of each process. Which scheduling algorithm will you use?
   1. First-Come First-Served
   2. Shortest Job First
   3. Shortest Remaining Time Next
   4. They are all the same.

(C) Suppose an instruction of 4 bytes length loads 4 consecutive bytes from memory and saves them in a register. What is the maximum number of page faults that this can cause?
   2 3 4 5 6

(D) If you want to use a non-preemptive algorithm that results in the shortest average waiting time, and you know that all processes are available simultaneously, which one will you use?
   1. First-Come First-Served
   2. Shortest Job First
   3. Shortest Remaining Time Next
   4. Round-Robin

(E) When a system contains a TLB, which of the following page table structure is better?
   1. single-level
   2. two-level
   3. three-level
   4. Will not make a difference
2. [4 points] In just 1-2 sentences explain when using DMA is beneficial and when it is not.

3. [4 points] Suppose you can only use test and set lock (TSL) or enabling/disabling interrupts for dealing with mutual exclusion. In one sentence say why would you prefer TSL over enabling/disabling interrupts. In another sentence say why would you prefer enabling/disabling interrupts over TSL.

4. [3 points] Suppose a virtual address is broken into four fields, a, b, c, and d. The first three are used for a three level page table system. The fourth field, d, is the offset. Which field(s) determine the number of pages in the virtual address? Explain.

5. [4 points] List one advantage and one disadvantage of using a large block size for a file.