(1) [4] Which class of computer spans the widest range of applications and performance?

(2) [4] According to the book, what will enhance performance better than optimizing the rare case?

(3) [4] Approximately how many processing steps are required going from a blank to a patterned wafer?

(4) [2] What are the two main ways to define performance?

(5) [4] 20 years ago, dynamic power consumption was more than an order of magnitude larger than leakage power. Approximately what percentage of power consumption is due to leakage now?

(6) [4] Why are there multiple dies on each silicon wafer? Why not just fabricate one huge die per wafer?

(7) [4] What is a benchmark program?

(8) [4] Do benchmarks remain valid indefinitely? Why or why not?

(9) [4] Clock rates have grown by a factor of 1000 while power consumed has only grown by a factor of 30. How was this accomplished, and why did it work?

(10) [6] An important program spends 30% of its time doing memory operations (loads and stores). By redesigning the memory hierarchy you can make the memory operations 99% faster (take 1% as long), or you can redesign the hardware to make the rest of the machine 50% faster (take 50% as long). Which should you do and why? (You must show your work to get full credit.)

(11) [6] Processor A requires 50 instructions to execute a given program, uses 3 cycle per instruction, and has a cycle time of 6 ns. Processor B requires 9 cycles per instruction, and requires 100 instructions to do the same program. What must the cycle time of Processor B be in order to give the same CPU time as Processor A? (Show your work)

(12) [4] Why is it so difficult for the internal processing elements on a chip to communicate with the outside world (things that are on other chips, for example)?