Quiz 1   CS 220   Spring 2012   Name:___Solution____

1. [2] What is the clock cycle time of a processor that has a clock frequency of 500 MHz? Express your answer in nanoseconds.

   Cycle Time = 1/frequency = 1/(500,000,000 cycles/sec) = 2ns

2. [2] How many bytes are there in 8 GB? Express your answer as a power of two.

   $1GB = 2^{30}$

   So 8GB is $8(2^{30}) = 2^3(2^{30}) = 2^{33}$

3. [2] For a program P, CPU1 has a CPI of 2 and a clock rate of 2GHz. For the same program CPU2 has a CPI of 2.5 and a clock rate of 2.6GHz. Which processor has better performance for P?

   CPUTime1 = 2(IC)/2GHz = IC/1GHz
   CPUTime2 = 2.5(IC)/2.6GHz = .96(IC)/1GHz

   *Speedup = Slower/Faster = (IC/1GHz)/(.96(IC)*1GHz)*

   IC cancels as do the GHz and we are left with 1/.96 = 1.042 or CPU2 is 4.2% faster.

4. [2] If a computer has 100 megabit per second network connection how long would it take to send a 20MB file?

   20MB = 160Mbits

   $$\frac{160\text{MBits}}{100\text{Mbits}/sec} = 1.6\,sec$$

5. [2] What decimal number does the binary number 110101 correspond to?

   53