Solutions to Practice Midterm 2

1. a. 3-4j
   b. -1-j
   c. 3 cos(wt) - 4 sin(wt)
   d. -5 sin(wt)
   e. 15
   f. 100 0101 0111

2. a. modular, software enabled, noise immunity
   b. capacitor is better because they behave more
      like ideal elements (less leakage) and are
      generally smaller
   c. need 12 bits, so 2 bytes are required
   d. 700*8 = 5600 bits are transmitted in 0.1 seconds
   e. 9 bit bus
   f. (coulumb^2 second^2) / (meter^2 Kilogram)

3. a. put A and A thru a NAND gate to get NOT A
      put B and B thru a NAND gate to get NOT B
      then, put NOT A and NOT B thru a NAND gate to get F = A + B
      finally, put F and F thru a NAND gate to get NOT F which is A NOR B

   b. P = B, Q = A
      The circuit interchanges A and B without using a crossover

4. a. V_out = (R/(R+ jwL)) V_in
   b. This is an easy plot.
   c. Low pass filter
   d. 3db bandwidth = R/L = 10^4 radians/sec