1. a. 3-4j  
b. -1-j  
c. 3 cos(\omega t) - 4 \sin(\omega t)  
d. -5 \sin(\omega t)  
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. (coulomb^2 second^2) / (meter^2 Kilogram)

3. a. put A and A thru a NAND gate to get NOT A  
then put B and B thru a NAND gate to get NOT B  
finally, 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 \( A \text{ NOR } B \)  

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

4. a. \( V_{out} = \frac{R}{(R+j\omega L)} V_{in} \)  
b. This is an easy plot.  
c. Low pass filter  
d. 3db bandwidth = \( \frac{R}{L} = 10^4 \text{ radians/sec} \)