ECE2280 **Homework #2**

Use the following equation for problem 1 and 2:

$$H(s) = \frac{5,000(s+1,000)}{(s+100)(s+10)}$$

1. (a) Plug in values of ω from 0.1 to 10^5 rad/sec. Plot this graph of dB vs ω. (Convert Volts/Volts to dB)
   (b) Sketch the Bode plots using a straight-line approximation (procedures described in class).

2. (a) Use Matlab to obtain the Bode Plot.
   (b) Compare the graphs from 1(a), 1(b), and 2(a). What differences do you see?

3. (a) Sketch the Bode plots for the equation below using a straight-line approximation (procedures described in class).
   (b) Use Matlab to obtain the Bode Plots.
   (c) Compare the two sketches.

$$H(s) = \frac{2,000(s+100)(s+1,000)}{s^2(s+5,000)}$$

4. (a) Sketch the Bode plots for the equation below using a straight-line approximation (procedures described in class).
   (b) Use Matlab to obtain the Bode Plots.
   (c) Compare the two sketches.

$$\mathrm{H(s)} = \frac{1x10^6 s^2}{(s+10)^2(s+1k)}$$

5. (a) Sketch the Bode plots for the equation below using a straight-line approximation (procedures described in class).
   (b) Use Matlab to obtain the Bode Plots.
   (c) Compare the two sketches.

$$H(s) = \frac{100k \cdot s}{(s+1)(s+1k)}$$

6. a) Sketch the Bode (both magnitude & phase) plot for: {label as many y values as possible for both magnitude and phase and/or each slope along with showing all your work}

$$H(s) = \frac{1x10^3(s+1)^3}{s\left(\frac{s}{100}+100\right)^2}$$

b) What is the estimated or actual magnitude value at ω= 10,000 rad/sec (in dB):
c) At what frequency does this circuit begin to operate?

7. Use Matlab to obtain the Bode plots for the equation in Problem 6. Compare the results.

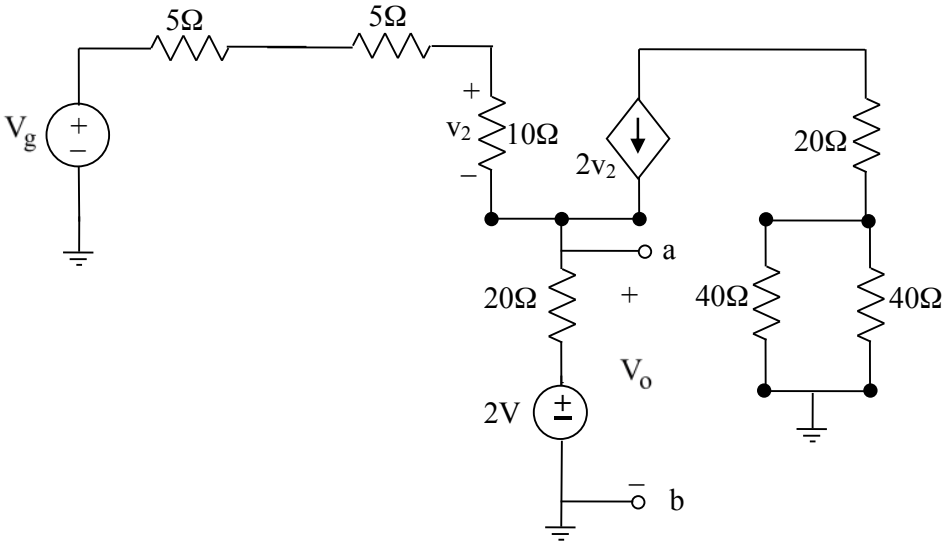
8. a) Sketch the Bode (both magnitude & phase) plot for: {label as many y values as possible for both magnitude and phase and/or each slope along with showing all your work}

$$H(s) = \frac{1x10^9(s+100)^3}{(s+10{,}000)^2\left(\frac{s}{10}+100\right)^2}$$

b) What is the estimated or actual magnitude value at ω= 10,000 rad/sec (in dB):

c) At what frequency does this circuit operate?

9. Assume that Vg is the input signal. Find the Thevenin equivalent between terminals a-b.



10. Assume that Vg is the input signal. Find the Thevenin equivalent between terminals a-b.