ECE 3050 Analog Electronics Quiz 12

November 11, 2009

Professor Leach Name_____

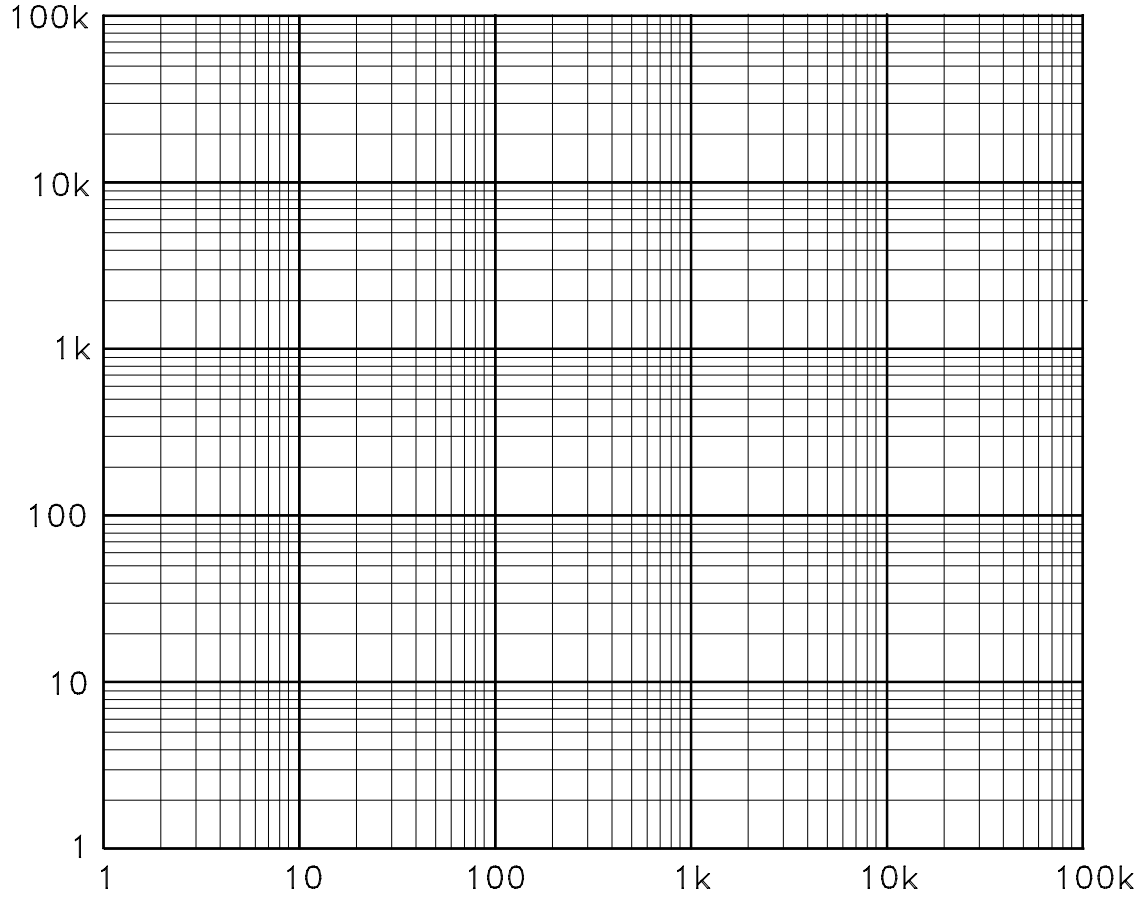
Instructions. Print your name in the space above. Place a box around your answers. Points will be subtracted if you do not express each numerical answer as a decimal number and if you do not put a box around answers. **Honor Code Statement:** *I have neither given nor received help on this quiz.* Initials _____

1 of 2. On the log-log scales below, sketch the Bode "straight-line" magnitude plots for the transfer functions given.

$$T_1(s) = 5000\frac{1+s/300}{(1+s/30)(1+s/5000)} \qquad T_2(s) = 300\frac{(s/30)(1+s/300)}{(1+s/30)(1+s/5000)}$$

$|T_1(j\omega)|$ starts at 5000, breaks to a slope of -1 at $\omega = 30$, shelves at a slope of 0 at $\omega = 300$ and a gain of 500, and breaks to a slope of -1 at $\omega = 5000$

$|T_2(j\omega)|$ starts at a slope of $+1$, shelves at a slope of 0 at $\omega = 30$ and a gain of 300, breaks to a slope of $+1$ at $\omega = 300$, and shelves at a slope of 0 at $\omega = 5000$ and a gain of 5000.



2 of 2. (a) What is the gain of the circuit at dc, i.e. zero frequency. $R_3/\left(R_1+R_3\right)$
(b) What is the gain at infinite frequency? $\left(R_2 \| R_3\right) / \left[R_1+\left(R_2 \| R_3\right)\right]$
(c) Write the transfer function for V_o/V_i. It should be in standard time constant form, i.e. all pole and zero terms should be of the form $(1+\tau s)$, where τ is the time constant.

$$\frac{V_o}{V_i}=\frac{R_3}{R_1+R_3}\frac{1+R_2Cs}{1+\left[\left(R_1 \| R_3\right)+R_2\right]Cs}$$