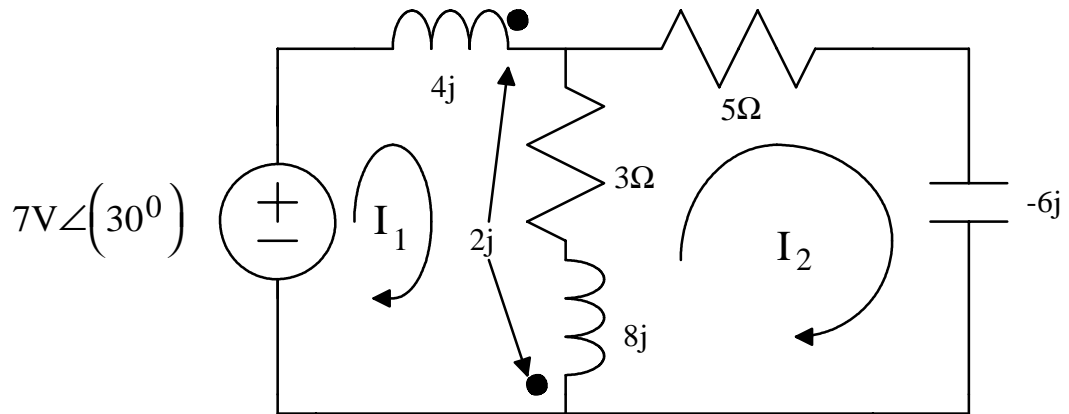


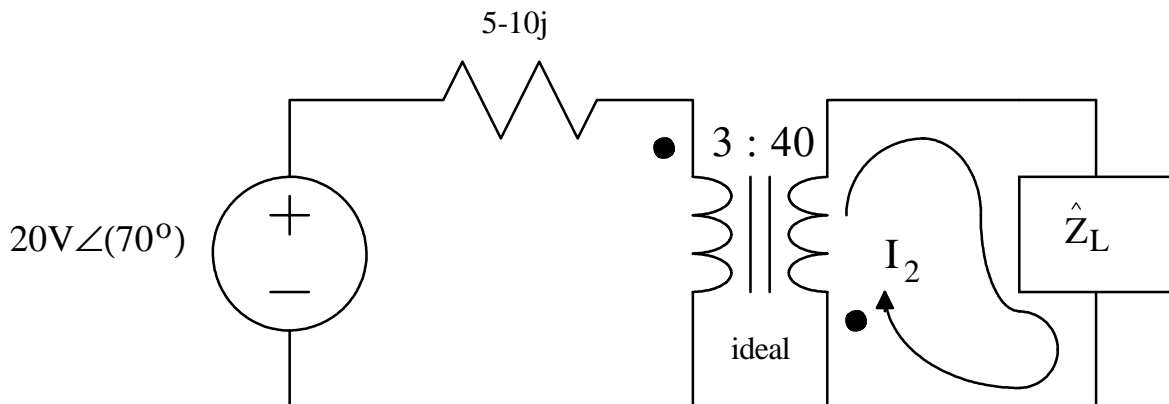
**PHY 3270**  
**FINAL EXAM**  
**SPRING 1993**

1. Write down the appropriate set of equations to solve for  $\hat{I}_1$  and  $\hat{I}_2$ , but do not solve them.



2. In the circuit shown below:

- (a.) What load impedance is required for maximum power to the load?  
 (b.) With this value of load impedance, what will the current  $\hat{I}_2$  be?

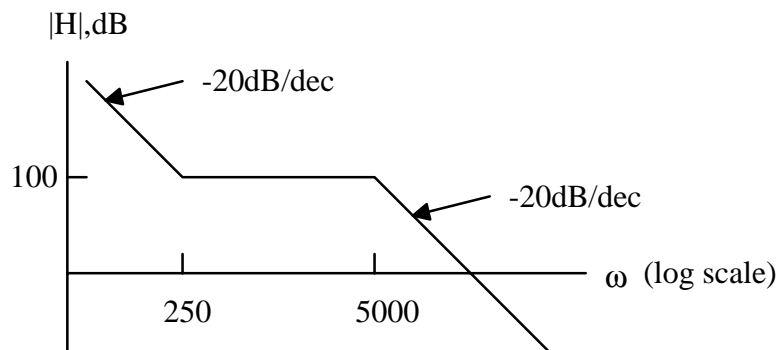


3. Given the following voltage gain, make (a.) a magnitude Bode plot and (b.) a phase angle Bode plot.

$$\hat{H}(j\omega) = \frac{-j\omega(20 \times 10^3)}{\left(10 + \frac{j\omega}{10}\right)\left(20 + \frac{j\omega}{5}\right)}$$

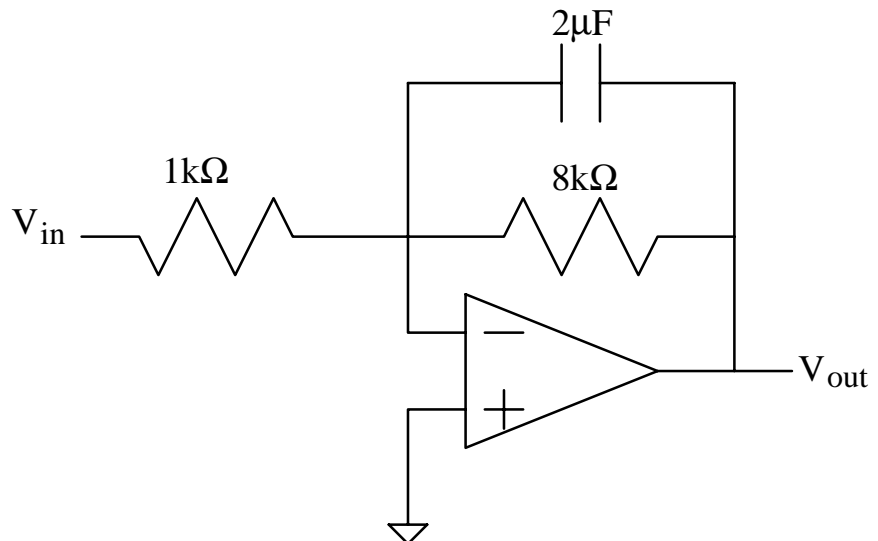
4. For the same transfer function as in 3., find the time dependent output voltage if the input voltage is  $2.00\text{mV} \cos(100t + 30^\circ)$ .

5. Find an algebraic expression for the transfer function which has a low frequency phase of  $-270^\circ$  (or  $+90^\circ$ ) and the magnitude Bode plot shown below.

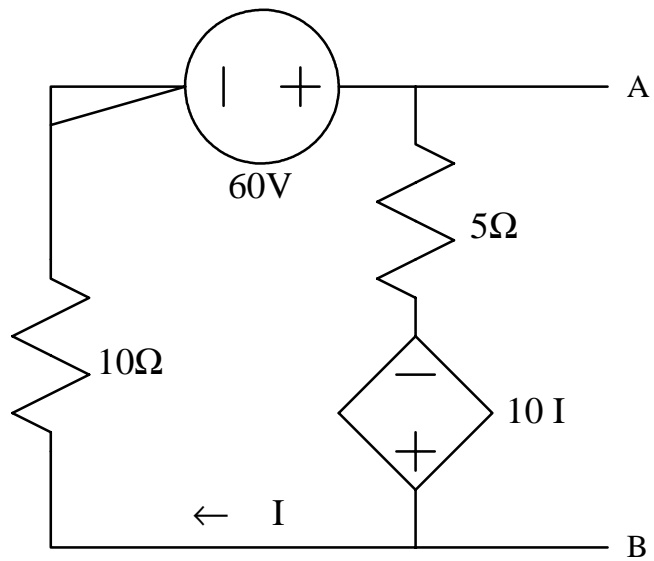


6. (a.) Determine the transfer function for the circuit shown below.

(b.) Construct a magnitude Bode plot for the function.



7. Find and draw the Thevenin equivalent for the circuit shown to the right.



8. For  $t < 0$ ,  $V_c(t) = 60V$ . Find  $V_c(t)$  for all  $t > 0$ .

