

UNIVERSITY OF UTAH
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

ECE 1270

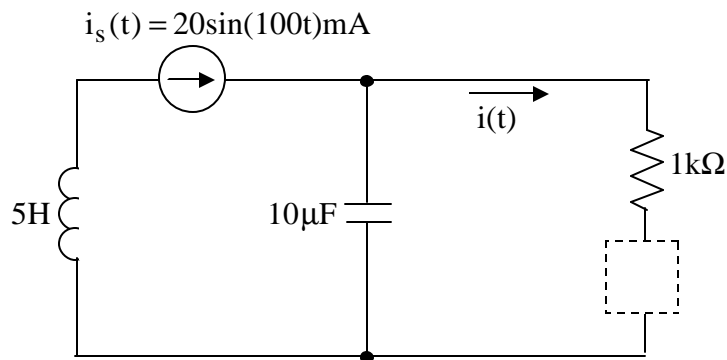
HOMEWORK #8

Spring 2008

1. Give numerical answers to each of the following questions:

- a) Rationalize $\frac{30 + j}{-5 - j15}$. Express your answer in rectangular form.
- b) Find the polar form of $e^{j30^\circ} \left(\frac{4 + 2j}{e^{j90^\circ}} \right)^*$. (Note the asterisk that means "conjugate".)
- c) Find the following phasor: $P[5\sin(377t - 20^\circ)]$.
- d) Find the magnitude of $\left(\frac{e^{j10^\circ}}{1 - j} \right) \left(\frac{-1}{(2 + 2j)e^{j30^\circ}} \right)$.
- e) Find the imaginary part of $\frac{\sqrt{3}e^{j150^\circ}}{5.2 + j9}$.

2.



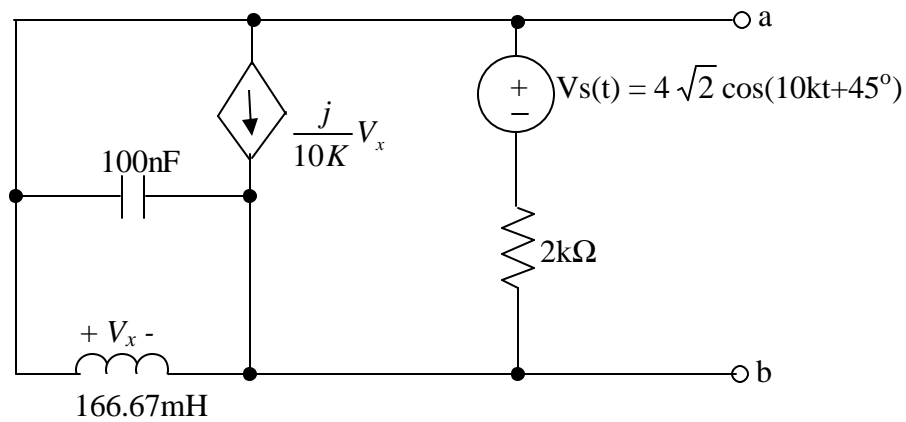
Choose an R, an L, or a C to be placed in the dashed-line box to make

$$i(t) = I_0 \cos(100t - 240^\circ)$$

where I_0 is a positive real constant (with units of Amps). State the value of the component you choose.

3. With your component from #2 in the circuit, calculate the resulting value of I_o .

4.



- Draw a frequency-domain equivalent of the above circuit. Show a numerical phasor value for $V_S(t)$, and show numerical impedance values for R , L , and C . Label the dependent source appropriately.
- Find the Thevenin equivalent (in the frequency domain) for the above circuit. Give the numerical phasor value for V_{TH} and the numerical impedance value of z_{TH} .