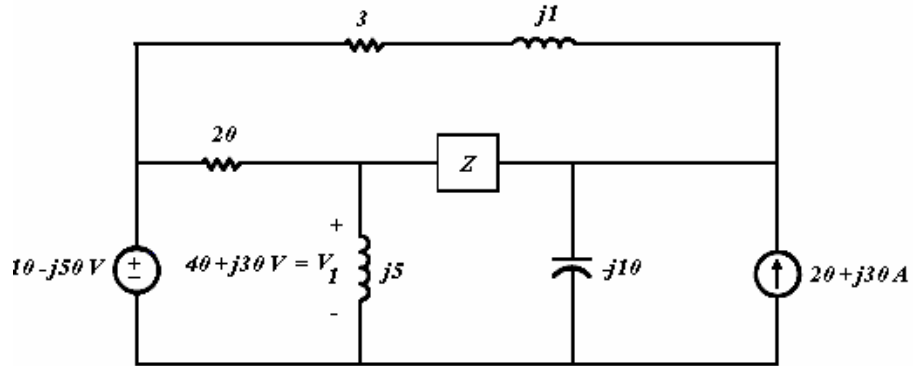
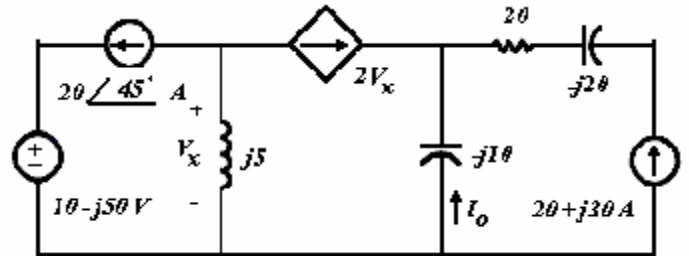


Practice Final Exam II: Fall 2004

1. Use **nodal analysis** to find  $Z$ . If the network operates at a radian frequency,  $\omega$ , of  $120\pi$  rads/sec, what are the component values that make up  $Z$ ?



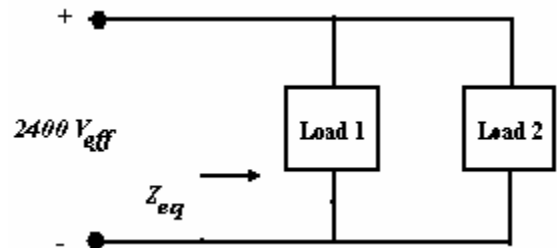
2. Use **mesh analysis** to find  $I_o$ . If the network operates at a radian frequency,  $\omega$ , of 200 rads/sec, what are the steady state expressions for  $i_o(t)$  and  $v_x(t)$ ?



3. What are the average & reactive powers,  $pf$  &  $rf$ , apparent powers, and complex powers of the following. Make sure to include proper units and whether the element(s) are absorbing or delivering the respective power.

Question (1):  $Z = 3 + j1$ ,  $Z = j5$ , and  $Z = -j10$   
 Question (2)  $V = 10 - j50$  V voltage source  
 $I = 20 + j30$  A current source.

4. The following describes the two loads:  
**L<sub>1</sub>: Absorbs 18kW and delivers 24kVAR**  
**L<sub>2</sub>: Absorbs 60kVA @ a 0.7 pf lead**  
 What components make up Load 2?  
 What is the  $Z_{eq}$ ? What is the  $pf$  of the equivalent load?



5. The following describes the two loads:  
**L<sub>1</sub>: Absorbs 24kW and delivers 18kVAR**  
**L<sub>2</sub>: Absorbs 60kVA @ a 0.6 pf lead**  
 What are the effective values of  $V_s$  and  $I_s$ ?  
 How much average & reactive power is associated with the line? What is the  $pf$  of the original load? What is  $Z_C$  if the new  $pf$  is to be 0.97? Unity?

