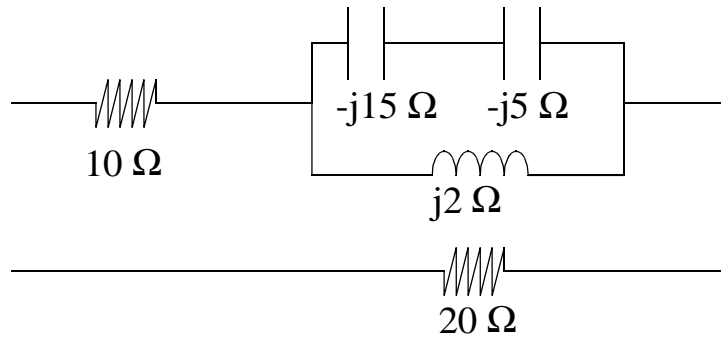
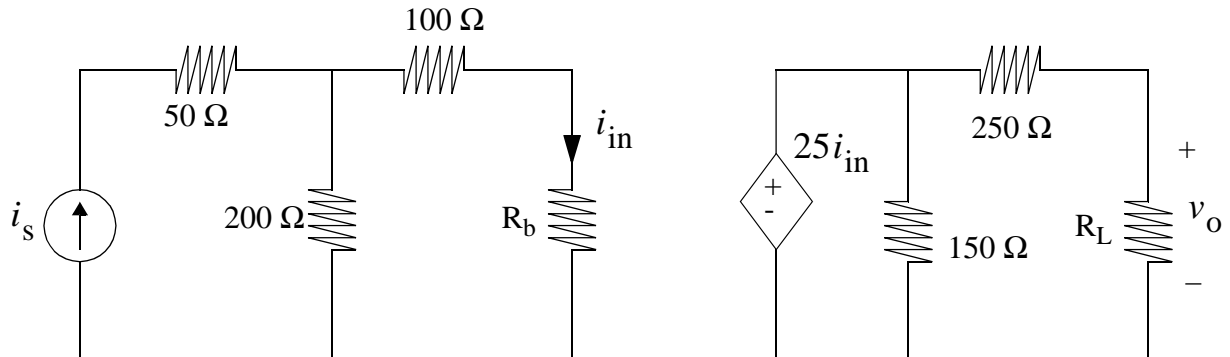


1) Find the equivalent impedance of the following circuit. You may use Maple or a calculator to do your calculations, but **show all of your steps** on paper. (25 pts)



2) Use the following diagram for the next set of questions. You are limited to using the four tools: Voltage Divider, Current Divider, Source Transformations, and Ohm's Law. You must show all your work to get full credit.: (25 pts)

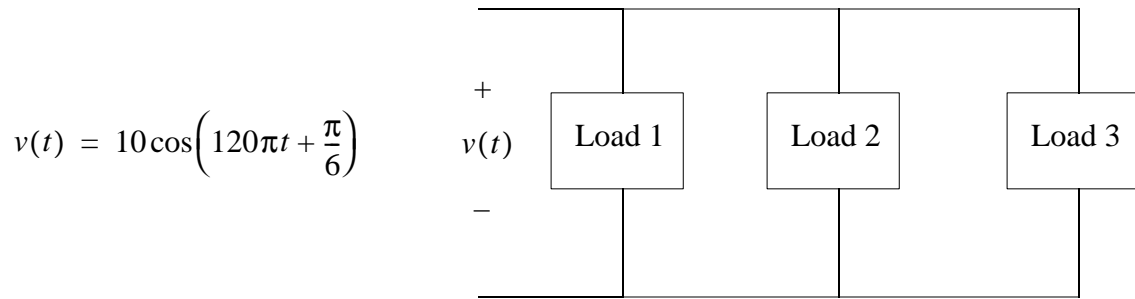


A) Determine whether  $R_b$  should be maximized or minimized to minimize the amplifier loading of the source. Provide an equation to justify your answer. (9 pts)

B) Determine whether  $R_L$  should be maximized or minimized to minimize the loading of the amplifier. Provide an equation to justify your answer. (9 pts)

C) Assuming that  $R_b = 25\ \Omega$  and  $R_L = 75\ \Omega$ , find the gain  $A = \frac{v_o}{i_s}$ . (7 pts)

3) Use the following diagram for the next series of questions (25 pts)



A) Load 1 is a capacitive load and absorbs 7.5 kW and 2.5 kVARs. What is the complex power absorbed by this load?(6 pts)

B) Load 2 is 10kVA at a 0.28 pf-leading. What is the complex power absorbed by this load? (6pts)

C) The impedance of Load 3 is  $12+j5 \Omega$ . What is the complex power absorbed by this load? (6pts)

D) Draw the power triangle for the combined power absorbed by all three loads. (7 pts)

4) Find the gain of the op-amp circuit  $A = \frac{v_o}{v_{in}}$  (25 pts)

