7.19 If the circuits shown in Figure P7.19 are to be at unity power factor, find C_P and C_S.

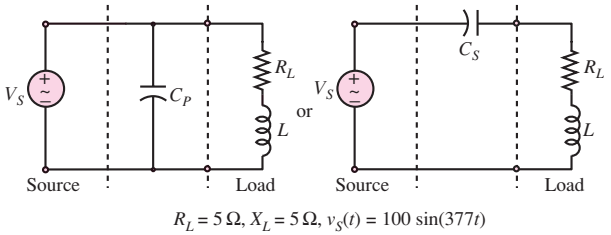

Figure P7.19

7.20 A 1,000 W electric motor is connected to a source of 120 V_{ms}, 60 Hz, and the result is a lagging pf of 0.8. To correct the pf to 0.95 lagging, a capacitor is placed in parallel with the motor. Calculate the current drawn from the source with and without the capacitor connected. Determine the value of the capacitor required to make the correction.

7.21 The motor inside a blender can be modeled as a resistance in series with an inductance, as shown in Figure P7.21.

a. What is the average power, P_{AV}, dissipated in the load?

b. What is the motor's power factor?

c. What value of capacitor when placed in parallel with the motor will change the power factor to 0.9 (lagging)?

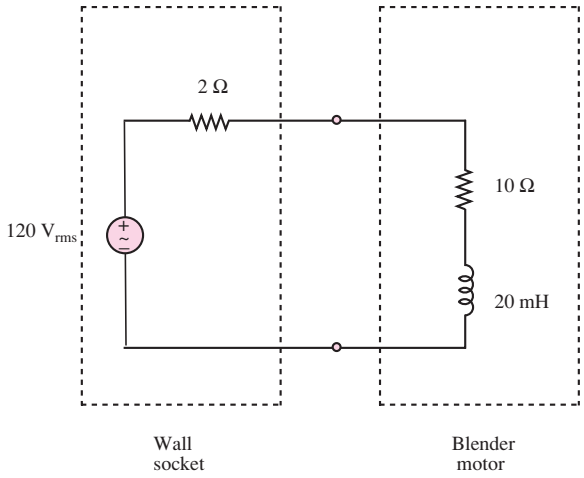

Figure P7.21

7.22 For the circuit shown in Figure P7.22,

a. Find the Thévenin equivalent circuit for the source.

b. Find the power dissipated by the load resistor.

c. What value of load impedance would permit maximum power transfer?

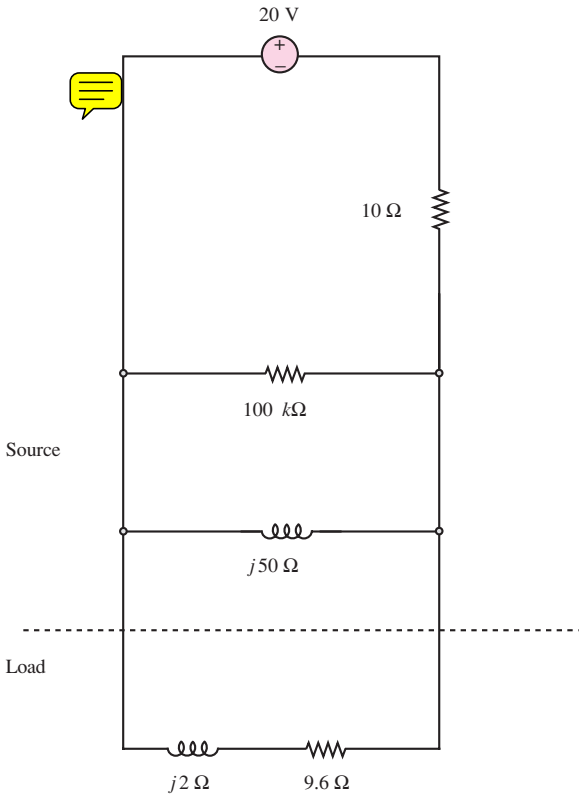

Figure P7.22

7.23 For the following numerical values, determine the average power P, the reactive power Q, and the complex power S of the circuit shown in Figure P7.23. Note: phasor quantities are rms.

a. $v_S(t) = 450\cos(377t)$ V
$i_L(t) = 50\cos(377t - 0.349)$ A

b. $\tilde{\mathbf{V}}_S = 140\angle 0$ V
$\tilde{\mathbf{I}}_L = 5.85\angle(-\pi/6)$ A

c. $\tilde{\mathbf{V}}_S = 50\angle 0$ V
$\tilde{\mathbf{I}}_L = 19.2\angle 0.8$ A

d. $\tilde{\mathbf{V}}_S = 740\angle(-\pi/4)$ V
$\tilde{\mathbf{I}}_L = 10.8\angle(-1.5)$ A

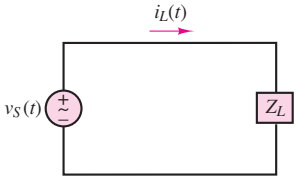

Figure P7.23