11.1 If $v(t) = 160 \cos 50t$ V and $i(t) = -33 \sin(50t - 30°)$ A, calculate the instantaneous power and the average power.

11.17 Calculate the value of $\mathbf{Z}_L$ in the circuit of Fig. 11.48 in order for $\mathbf{Z}_L$ to receive maximum average power. What is the maximum average power received by $\mathbf{Z}_L$?

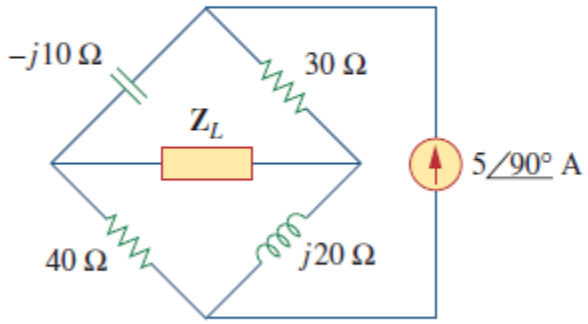

Figure 11.48
For Prob. 11.17.

11.27 Calculate the rms value of the current waveform of Fig. 11.58.

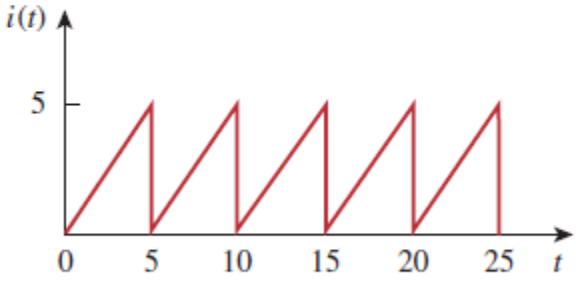

Figure 11.58
For Prob. 11.27.

11.39 An ac motor with impedance $\mathbf{Z}_L = 4.2 + j3.6\ \Omega$ is supplied by a 220-V, 60-Hz source. (a) Find pf, P, and Q. (b) Determine the capacitor required to be connected in parallel with the motor so that the power factor is corrected to unity.

11.42 A 110-V rms, 60-Hz source is applied to a load impedance **Z**. The apparent power entering the load is 120 VA at a power factor of 0.707 lagging.

(a) Calculate the complex power.

(b) Find the rms current supplied to the load.

(c) Determine **Z**.

(d) Assuming that $\mathbf{Z} = R + j\omega L$, find the values of R and L.

11.63 Find $\mathbf{I}_o$ in the circuit of Fig. 11.82.

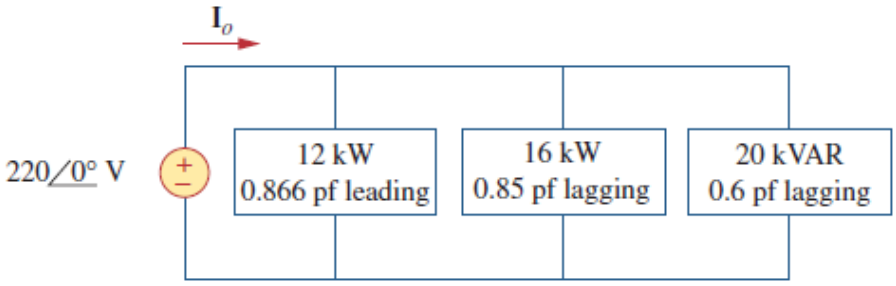

Figure 11.82
For Prob. 11.63.

11.73 A 240-V rms 60-Hz supply serves a load that is 10 kW (resistive), 15 kVAR (capacitive), and 22 kVAR (inductive). Find:

(a) the apparent power

(b) the current drawn from the supply

(c) the kVAR rating and capacitance required to improve the power factor to 0.96 lagging

(d) the current drawn from the supply under the new power-factor conditions