باسمه تعالی

سری هفتم درس مدارهای الکتریکی ۱ نام استاد: خانی تکلیف

موعد تحویل: چهارشنبه ۱۳۹۵/۲/۲۹ ساعت ۲ بعد از ظهر، ابتدای جلسه

1. Calculate the average power delivered to the impedance $6\angle 25^\circ\ \Omega$ by the current $\mathbf{I} = 2 + j5$ A.

Ans: 78.85 W.

2. For the circuit of Fig. 11.6, compute the average power delivered to each of the passive elements. Verify your answer by computing the power delivered by the two sources.

Ans: 0, 37.6 mW, 0, 42.0 mW, −4.4 mW.

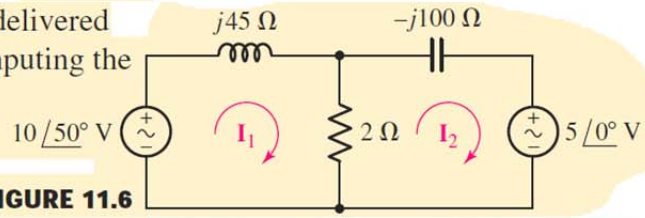

FIGURE 11.6

11.8 For the circuit of Fig. 11.14, determine the power factor of the combined loads if $Z_L = 10\ \Omega$.

Ans: 0.9966 leading.

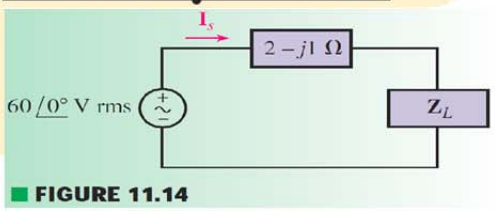

FIGURE 11.14

3. An industrial consumer is operating a 50 kW induction motor at a lagging PF of 0.8. The source voltage is 230 V rms. In order to obtain lower electrical rates, the customer wishes to raise the PF to 0.95 lagging. Specify a suitable solution.

11.9 For the circuit shown in Fig. 11.22, find the complex power absorbed by the (*a*) 1 Ω resistor; (*b*) $-j10\ \Omega$ capacitor; (*c*) $5 + j10\ \Omega$ impedance; (*d*) source.

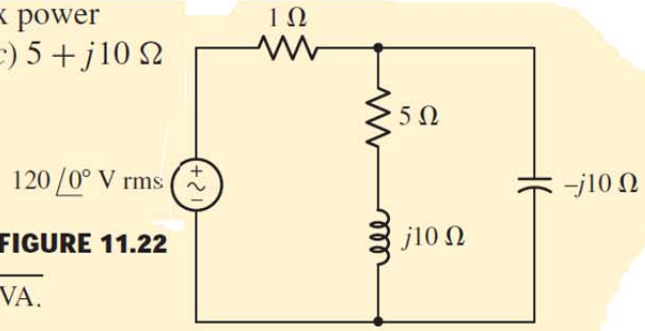

FIGURE 11.22

Ans: $26.6 + j0$ VA; $0 - j1331$ VA; $532 + j1065$ VA; $-559 + j266$ VA.

4. Determine both the average and rms value of each waveform depicted in Fig. 11.36.

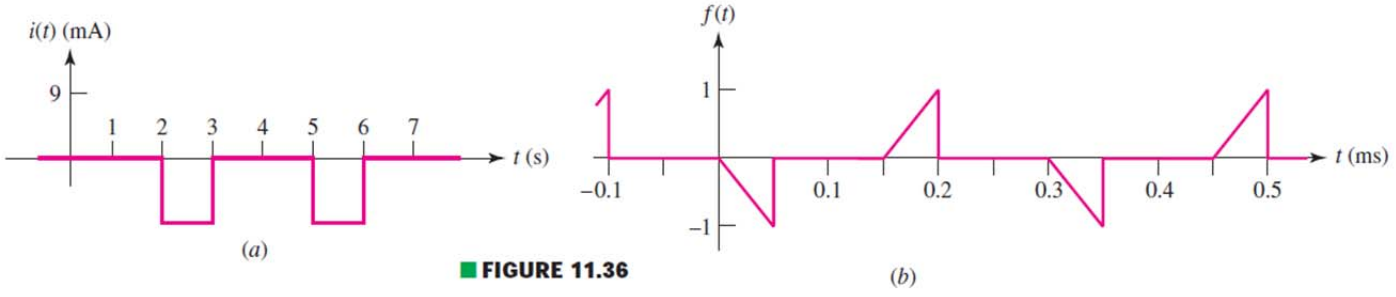

FIGURE 11.36

5. Calculate the power factor at which the source in Fig. 11.40 is operating if the load is (*a*) purely resistive; (*b*) $1000 + j900\ \Omega$; (*c*) $500/-5^\circ\ \Omega$.

6. Determine the load impedance for the circuit depicted in Fig. 11.40 if the source is operating at a PF of (*a*) 0.95 leading; (*b*) unity; (*c*) 0.45 lagging.

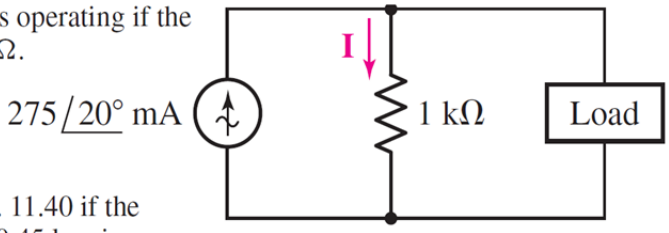

FIGURE 11.40

7. Compute the complex power **S** (in polar form) drawn by a certain load if it is known that (*a*) it draws 100 W average power at a lagging PF of 0.75; (*b*) it draws a current $\mathbf{I} = 9 + j5$ A rms when connected to the voltage $120\angle 32°$ V rms; (*c*) it draws 1000 W average power and 10 VAR reactive power at a leading PF; (*d*) it draws an apparent power of 450 W at a lagging PF of 0.65.

8. For each power triangle depicted in Fig. 11.42, determine **S** (in polar form) and the PF.

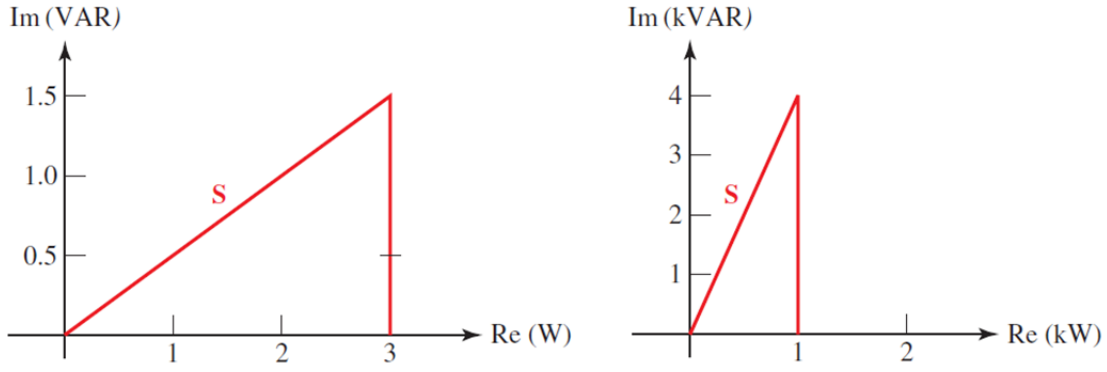

FIGURE 11.42

9. What value of capacitance must be added in parallel to the 10Ω resistor of Fig. 11.44 to increase the PF of the source to 0.95 at 50 Hz?

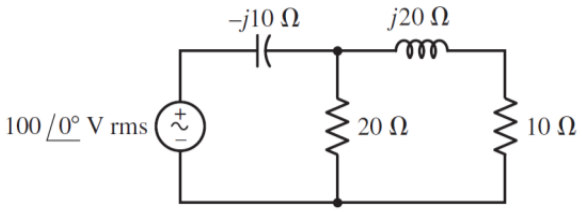

FIGURE 11.44

10. Calculate the complex power delivered to each passive component of the circuit shown in Fig. 11.45, and determine the power factor of the source.

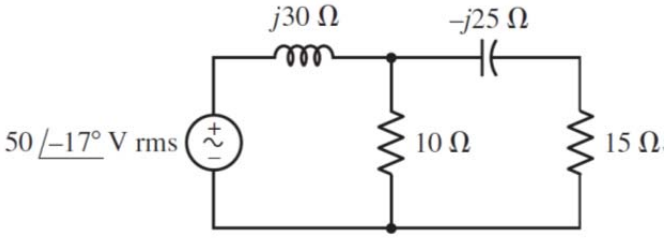

FIGURE 11.45

11. Replace the 10 Ω resistor in the circuit of Fig. 11.45 with a 200 mH inductor, assume an operating frequency of 10 rad/s, and calculate (*a*) the PF of the source; (*b*) the apparent power supplied by the source; (*c*) the reactive power delivered by the source.

Best Luck!