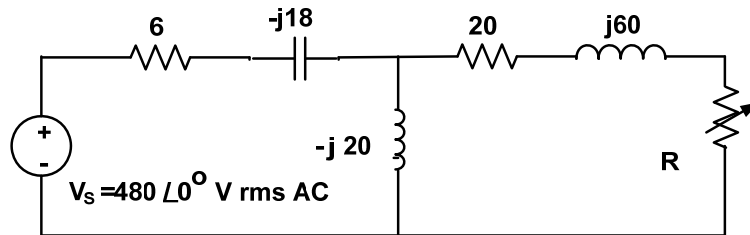


1. (10.34) The variable resistor shown in Figure 10.34 is adjusted until the average power it absorbs is maximum.

- a. Find R .
- b. Find the maximum average power.



Units for impedances are Ohms

Figure 10.34

2. Three loads are connected in parallel across a 480V rms line. Load 1 absorbs 12kW and 6.7 kVAR. Load 2 absorbs 4kVA at 0.96 power factor leading. Load 3 absorbs 15kW at 1.00 power factor.

- a. Find the current in Load 1.
- b. Load 2 is a combination of a resistance and a capacitance. If these two elements are in parallel with each other, find the resistance and reactance values of each of them.
- c. Find the real power, reactive power, and apparent power absorbed by the combined three loads.

3. A certain load has a voltage of 120V AC at 60 Hertz. It draws 3.0 Amps.

- a. Let the voltage and current be in phase. Determine and sketch the power that this load draws as a function of time. Draw the voltage on the same set of axes for reference.
- b. Let the power factor be 0.90 lagging; determine and sketch the power that this load draws as a function of time. Draw the voltage on the same set of axes for reference.

4. (10.37) A factory has an electrical load of 1600 kW at a lagging power factor of 0.80. An additional variable power factor load is to be added to the factory. The new load will add 320 kW to the real power load of the factory. The power factor of the added load is to be adjusted so that the overall power factor of the factory is 0.96 leading.

- A. Specify the reactive power associated with the added load.
- B. Does the added load absorb or deliver magnetizing VARs?
- C. What is the power factor of the additional load?
- D. Assume that the rms voltage at the factory is 2400V. What is the rms magnitude of the current into the factory before the variable power factor load is added?
- E. What is the rms magnitude of the current into the factory after the variable power factor load has been added?

There is more on the other side of this page.

5. (10.44) If a third resistor is added to a hair dryer circuit, it is possible to design three independent power specifications. If the resistor R_3 is added in series with the thermal fuse, then the corresponding LOW, MEDIUM, and HIGH power circuit diagrams are as shown in Figure 10.44. If the three power settings are 600W, 900W, and 1200W, respectively, when connected to a 120V rms supply, what resistor values should be used?

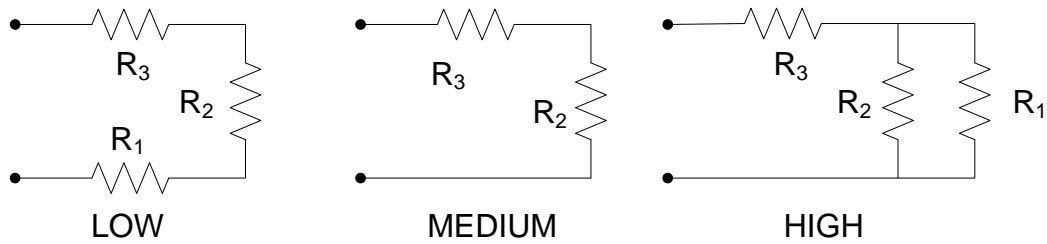


Figure 10.44