

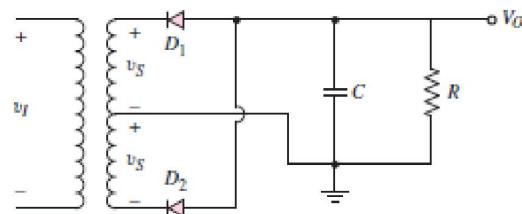
**Exercise 10.12** A power-supply circuit is needed to deliver 0.1 A and 15 V (average) to a load. The ac source has a frequency of 60 Hz. Assume that the circuit of Figure 10.26 is to be used. The peak-to-peak ripple voltage is to be 0.4 V. Instead of assuming an ideal diode, allow 0.7 V for forward diode drop. Find the peak ac voltage  $V_m$  needed and the approximate value of the smoothing capacitor. (*Hint:* To achieve an average load voltage of 15 V with a ripple of 0.4 V, design for a peak load voltage of 15.2 V.)

Design a half-wave rectifier power supply to deliver an average voltage of 9 V with a peak-to-peak ripple of 2 V to a load. The average load current is 100 mA. Assume that ideal diodes and 60-Hz ac voltage sources of any amplitudes needed are available. Draw the circuit diagram for your design. Specify the values of all components used.

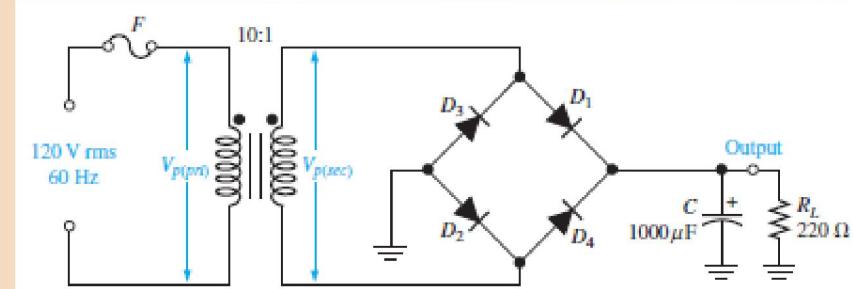
A full-wave rectifier is to be designed to produce a peak output voltage of 12 V, deliver 120 mA to the load, and produce an output with a ripple of not more than 5 percent. An input line voltage of 120 V (rms), 60 Hz is available.

- A half-wave rectifier is needed to supply 15-V dc to a load that draws an average current of 250 mA. The peak-to-peak ripple is required to be 0.2 V or less. What is the minimum value allowed for the smoothing capacitance? If a full-wave rectifier is needed?

The full-wave rectifier circuit shown in Figure P2.12 has an input signal whose frequency is 60 Hz. The rms value of  $v_S = 8.5$  V. Assume each diode cut-in voltage is  $V_y = 0.7$  V. (a) What is the maximum value of  $V_O$ ? (b) If  $R = 10 \Omega$ , determine the value of  $C$  such that the ripple voltage is no larger than 0.25 V. (c) What must be the PIV rating of each diode?



Determine the ripple factor for the filtered bridge rectifier with a load as indicated in Figure 2-48.









A full-wave rectifier is to be designed to produce a peak output voltage of 12 V, deliver 120 mA to the load, and produce an output with a ripple of not more than 5 percent. An input line voltage of 120 V (rms), 60 Hz is available.