

16. If the filtered load current is 10 mA, which of the following has a diode current of 10 mA?

- Half-wave rectifier
- Full-wave rectifier
- Bridge rectifier
- Impossible to say

17. If the load current is 5 mA and the filter capacitance is 1000 μF , what is the peak-to-peak ripple out of a bridge rectifier?

- 21.3 pV
- 56.3 nV
- 21.3 mV
- 41.7 mV

18. The diodes in a bridge rectifier each have a maximum dc current rating of 2 A. This means the dc load current can have a maximum value of

- 1 A
- 2 A
- 4 A
- 8 A

19. What is the PIV across each diode of a bridge rectifier with a secondary voltage of 20 V rms?

- 14.1 V
- 20 V
- 28.3 V
- 34 V

20. If the secondary voltage increases in a bridge rectifier with a capacitor-input filter, the load voltage will

- Decrease
- Stay the same
- Increase
- None of these

21. If the filter capacitance is increased, the ripple will

- Decrease
- Stay the same
- Increase
- None of these

22. A circuit that removes positive or negative parts of a waveform is called a

- Clamper
- Clipper
- Diode clamp
- Limiter

23. A circuit that adds a positive or negative dc voltage to an input sine-wave is called a

- Clamper
- Clipper
- Diode clamp
- Limiter

24. For a clamper circuit to operate properly, its $R_L C$ time constant should be

- Equal to the period T of the signal
- > 10 times the period T of the signal
- > 100 times the period T of the signal
- < 10 times the period T of the signal

25. Voltage multipliers are circuits best used to produce

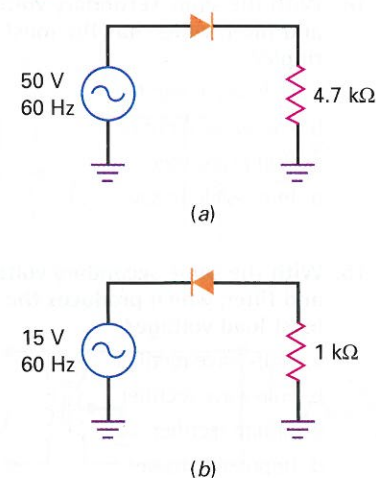
- Low voltage and low current
- Low voltage and high current
- High voltage and low current
- High voltage and high current

Problems

SEC. 4-1 THE HALF-WAVE RECTIFIER

4-1 **MultiSim** What is the peak output voltage in Fig. 4-36a if the diode is ideal? The average value? The dc value? Sketch the output waveform.

Figure 4-36



4-2 **MultiSim** Repeat the preceding problem for Fig. 4-36b.

4-3 **MultiSim** What is the peak output voltage in Fig. 4-36a using the second approximation of a diode? The average value? The dc value? Sketch the output waveform.

4-4 **MultiSim** Repeat the preceding problem for Fig. 4-36b.

SEC. 4-2 THE TRANSFORMER

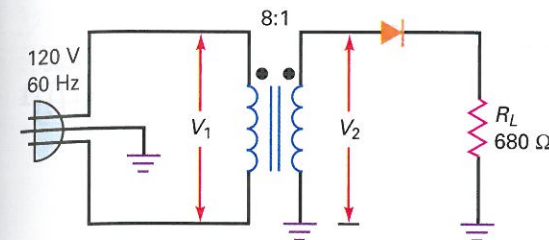
4-5 If a transformer has a turns ratio of 6:1, what is the rms secondary voltage? The peak secondary voltage? Assume a primary voltage of 120 V rms.

4-6 If a transformer has a turns ratio of 1:12, what is the rms secondary voltage? The peak secondary voltage? Assume a primary voltage 120 V rms.

4-7 Calculate the peak output voltage and the dc output voltage in Fig. 4-37 using an ideal diode.

4-8 Calculate the peak output voltage and the dc output voltage in Fig. 4-37 using the second approximation.

Figure 4-37



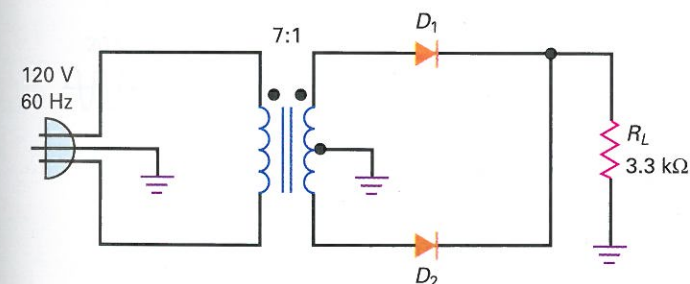
SEC. 4-3 THE FULL-WAVE RECTIFIER

4-9 A center-tapped transformer with 120 V input has a turns ratio of 4:1. What is the rms voltage across the upper half of the secondary winding? The peak voltage? What is the rms voltage across the lower half of the secondary winding?

4-10 **MultiSim** What is the peak output voltage in Fig. 4-38 if the diodes are ideal? The average value? The dc value? Sketch the output waveform.

4-11 **MultiSim** Repeat the preceding problem using the second approximation.

Figure 4-38



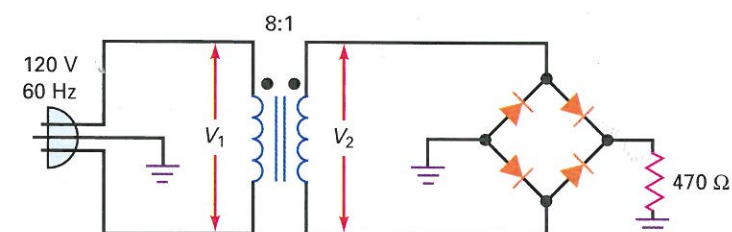
SEC. 4-4 THE BRIDGE RECTIFIER

4-12 **MultiSim** In Fig. 4-39, what is the peak output voltage if the diodes are ideal? The average value? The dc value? Sketch the output waveform.

4-13 **MultiSim** Repeat the preceding problem using the second approximation.

4-14 If the line voltage in Fig. 4-39 varies from 105 to 125 V rms, what is the minimum dc output voltage? The maximum?

Figure 4-39



SEC. 4-5 THE CHOKE-INPUT FILTER

4-15 A half-wave signal with a peak of 20 V is the input to a choke-input filter. If $X_L = 1 \text{ k}\Omega$ and $X_C = 25 \Omega$, what is the approximate peak-to-peak ripple across the capacitor?

4-16 A full-wave signal with a peak of 14 V is the input to a choke-input filter. If $X_L = 2 \text{ k}\Omega$ and $X_C = 50 \Omega$, what is the approximate peak-to-peak ripple across the capacitor?

SEC. 4-6 THE CAPACITOR-INPUT FILTER

4-17 What is the dc output voltage and ripple in Fig. 4-40a? Sketch the output waveform.

4-18 In Fig. 4-40b, calculate the dc output voltage and ripple.

4-19 What happens to the ripple in Fig. 4-40a if the capacitance value is reduced to half?

4-20 In Fig. 4-40a, what happens to the ripple if the resistance is reduced to 500 Ω ?

4-21 What is the dc output voltage in Fig. 4-41? The ripple? Sketch the output waveform.

4-22 If the line voltage decreases to 105 V in Fig. 4-41, what is the dc output voltage?

SEC. 4-7 PEAK INVERSE VOLTAGE AND SURGE CURRENT

4-23 What is the peak inverse voltage in Fig. 4-41?

4-24 If the turns ratio changes to 3:1 in Fig. 4-41, what is the peak inverse voltage?

SEC. 4-8 OTHER POWER-SUPPLY TOPICS

4-25 An F-25X replaces the transformer of Fig. 4-41. What is the approximate peak voltage across the secondary winding? The approximate dc output voltage? Is the transformer being operated at its rated output current? Will the dc output voltage be higher or lower than normal?

4-26 What is the primary current in Fig. 4-41?

4-27 What is the average current through each diode in Fig. 4-40a and 4-40b?

4-28 What is the average current through each diode of Fig. 4-41?