



[1] In the circuit of Fig. 1, let v_S have a peak value of 10 V and $R = 1\text{ k}\Omega$. Find the peak value of i_D and the dc component of v_O .

Ans. 10 mA; 3.18 V

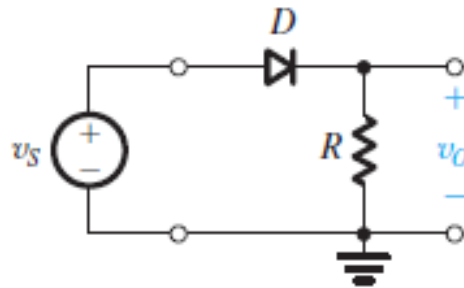


Fig. 1

[2] Find the values of I and V in the circuits shown in Fig. 2.

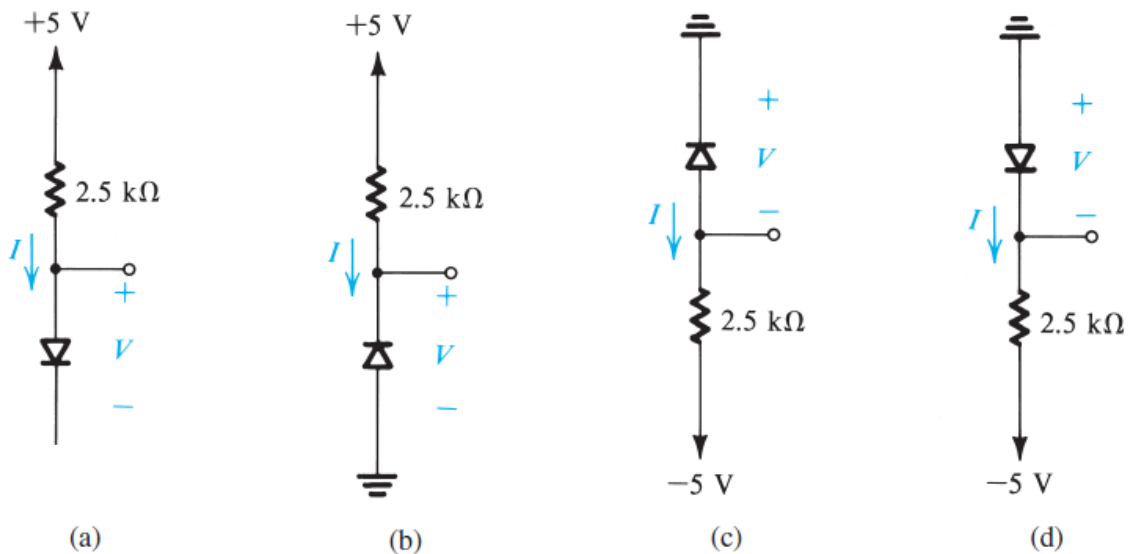


Fig. 2

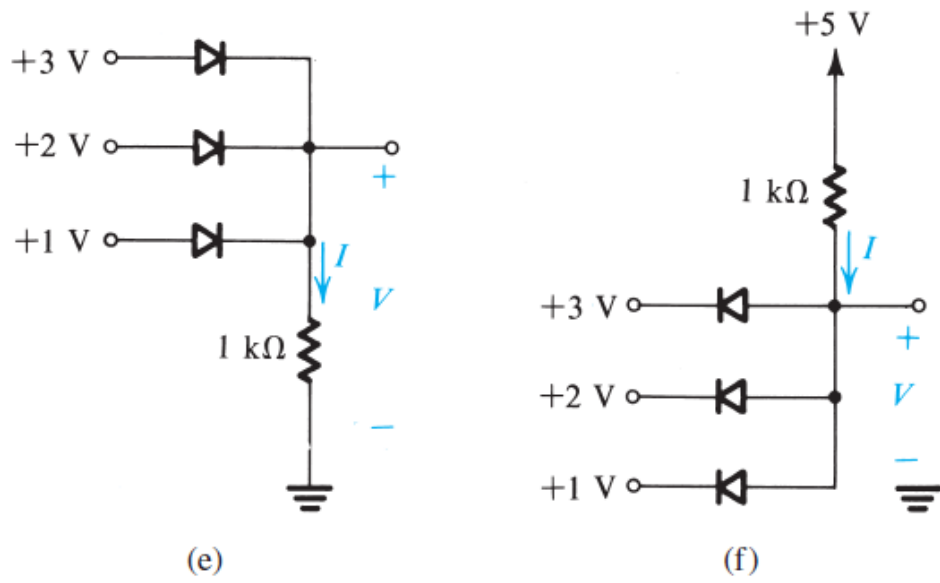


Fig. 2 (Continued)

[3] A silicon junction diode has $v = 0.7 \text{ V}$ at $i = 1 \text{ mA}$. Find the voltage drop at $i = 0.1 \text{ mA}$ and $i = 10 \text{ mA}$.

Ans. 0.64 V; 0.76 V

[4] A zener diode exhibits a constant voltage of 5.6 V for currents greater than five times the knee current. I_{ZK} is specified to be 1 mA. The zener is to be used in the design of a shunt regulator fed from a 15-V supply. The load current varies over the range of 0 mA to 15 mA. Find a suitable value for the resistor R . What is the maximum power dissipation of the zener diode?

Ans. 470 Ω ; 112 mW

[5] For the circuits shown in Fig. 3 using ideal diodes, find the values of the voltages and currents indicated.

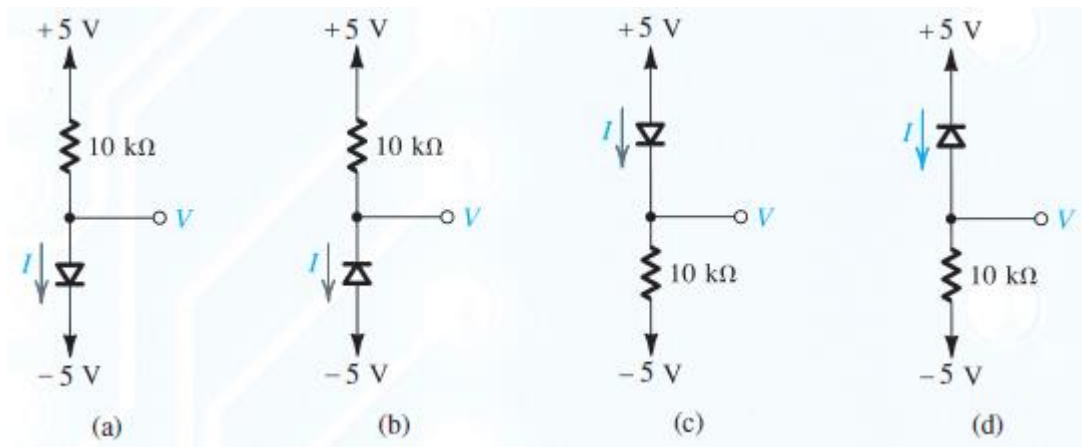


Fig. 3

[6] In each of the ideal-diode circuits shown in Fig. 4, v_i is a 1-kHz, 10-V peak sine wave. Sketch the waveform resulting at v_o . What are its positive and negative peak values?

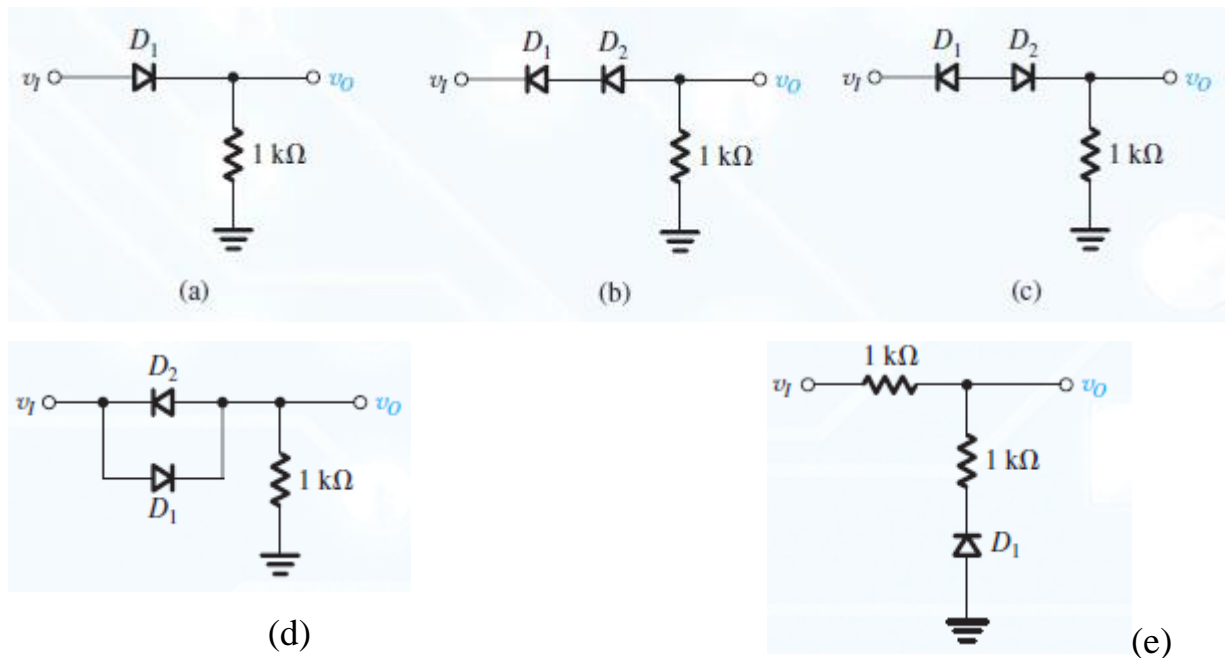


Fig. 4

[7] For the rectifier circuit of Fig. 5, let the input sine wave have 120-V rms value and assume the diode to be ideal. Select a suitable value for R so that the peak diode current does not exceed 50 mA. What is the greatest reverse voltage that will appear across the diode?

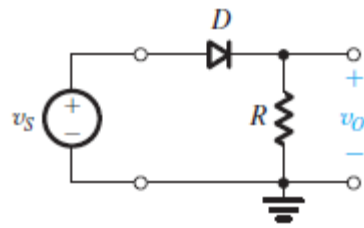


Fig. 5

- [8] A symmetrical square wave of 3-V peak-to-peak amplitude and zero average is applied to a circuit resembling that in Fig. 1 and employing a 100- Ω resistor. What is the peak output voltage that results? What is the average output voltage that results? What is the peak diode current? What is the average diode current? What is the maximum reverse voltage across the diode?
- [9] The circuit in Fig. 6 utilizes three identical diodes having $I_s = 10^{-16}$ A. Find the value of the current I required to obtain an output voltage $V_o = 2.4$ V. If a current of 1 mA is drawn away from the output terminal by a load, what is the change in output voltage?

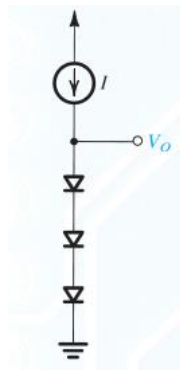


Fig. 6