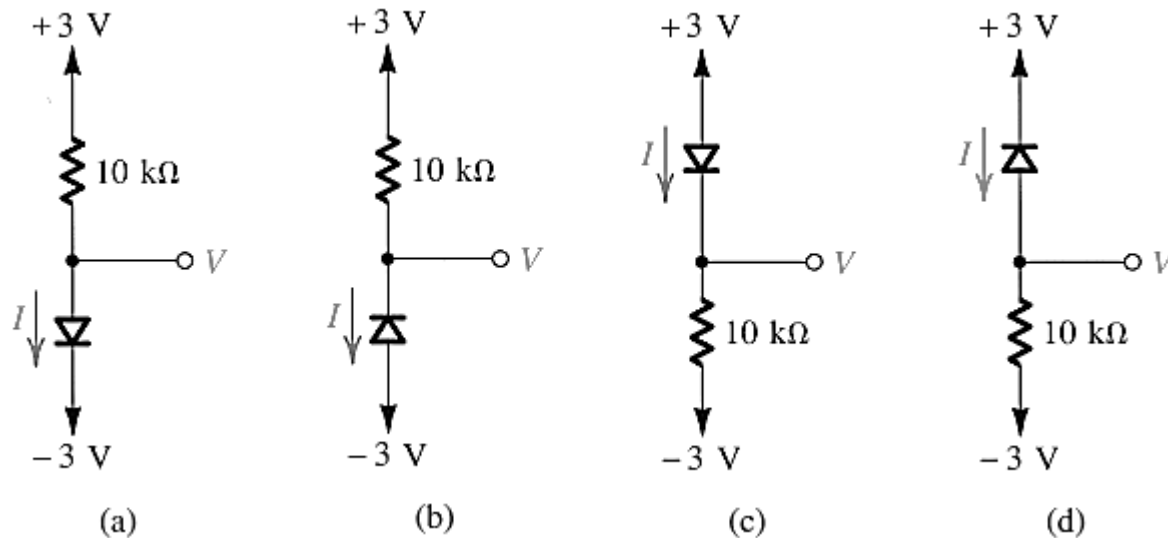


REVIEW QUESTIONS

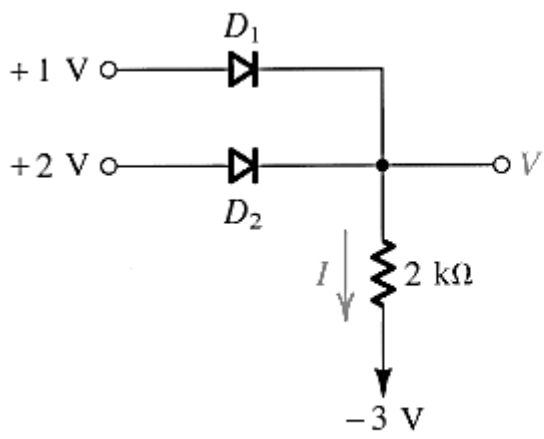
1. Write short notes about the following items with the aid of formulas and sketches:
 - a. Diode models (hint: Ideal – Practical – Complete – actual)

Problems

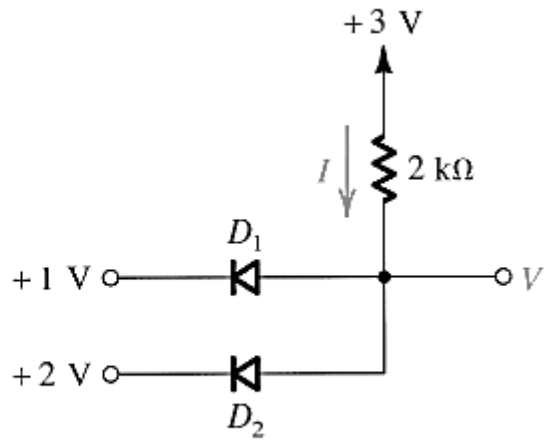
2.1 For the circuits shown in Fig. P2.1 using ideal diodes, find the values of the voltages and currents indicated.



2.2 For the circuits shown in Fig. P2.2 using ideal diodes, find the values of the labeled voltages and currents.

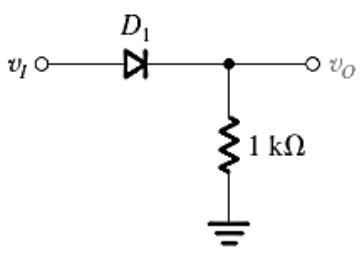


(a)

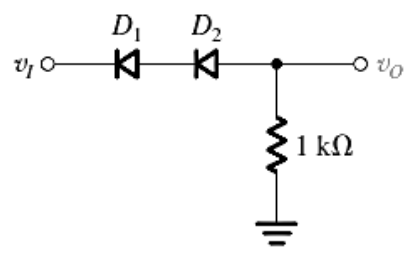


(b)

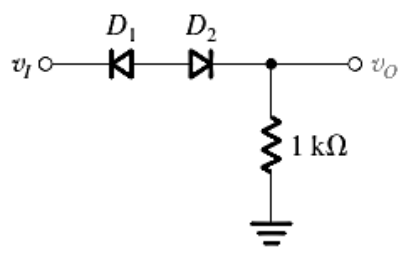
2.3 In each of the ideal-diode circuits shown in Fig. P2.3, v_I is a 1-kHz, 5-V peak sine wave. Sketch the waveform resulting at v_O . What are its positive and negative peak values?



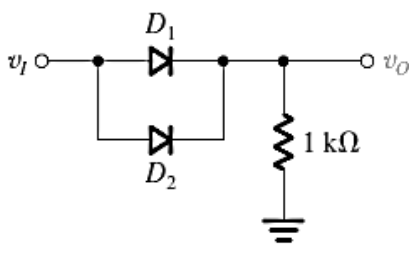
(a)



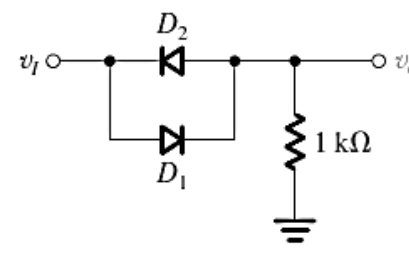
(b)



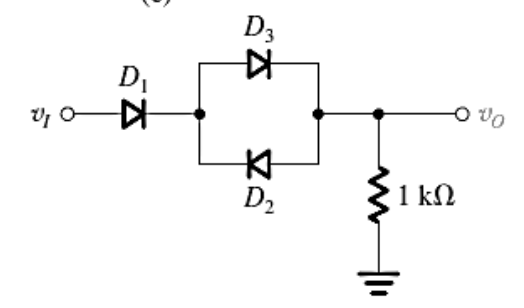
(c)



(d)



(e)



(f)

2.4 A “1-mA diode” (i.e., one that has $v_D = 0.7$ V at $i_D = 1$ mA) is connected in series with a 500- resistor to a 1.0 V supply. Provide a rough estimate of the diode current you would expect.

2.5 Assuming the availability of diodes for which $v_D = 0.75$ V at $i_D = 1$ mA, design a circuit that utilizes four diodes connected in series, in series with a resistor R connected to a 15-V power supply. The voltage across the string of diodes is to be 3.3 V. (hint: use actual diode model)

2.6 For the circuits shown in Fig. P2.1, using the constant-voltage-drop ($V_D = 0.7$ V) diode model, find the voltages and currents indicated.

2.7 For the circuits shown in Fig. P2.2, using the constant-voltage-drop ($V_D = 0.7$ V) diode model, find the voltages and currents indicated.

2.8 Design a diode voltage regulator to supply 1.5 V to a 1.5-k ohm load. Use two diodes specified to have a 0.7-V drop at a current of 1 mA. The diodes are to be connected to a +5-V supply through a resistor R. Specify the value for R. What is the diode current with the load connected? What is the increase resulting in the output voltage when the load is disconnected? What change results if the load resistance is reduced to 1 k ohms? (Hint: Use the small-signal diode model to calculate all changes in output voltage.)