Figure 8-20

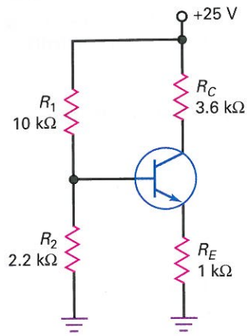


Figure 8-21

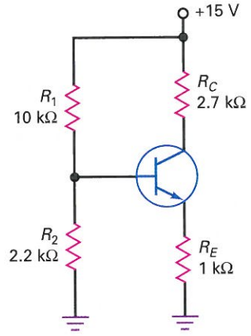
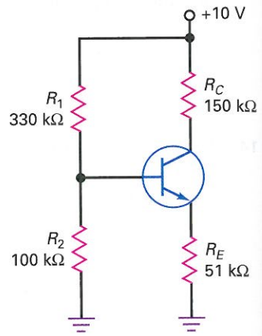


Figure 8-22



SEC. 8-3 VDB LOAD LINE AND *Q* POINT

8-7 What is the *Q* point for Fig. 8-20?

8-8 What is the *Q* point for Fig. 8-21?

8-9 What is the *Q* point for Fig. 8-22?

8-10 What is the *Q* point for Fig. 8-23?

8-11 All resistors in Fig. 8-22 have a tolerance of ±5 percent. What is the lowest value of the collector current? The highest?

8-12 The power supply of Fig. 8-23 has a tolerance of ±10 percent. What is the lowest possible value of the collector current? The highest?

SEC. 8-4 TWO-SUPPLY EMITTER BIAS

8-13 What is the emitter current in Fig. 8-24? The collector voltage?

8-14 If all resistances are doubled in Fig. 8-24, what is the emitter current? The collector voltage?

8-15 All resistors in Fig. 8-24 have a tolerance of ±5 percent. What is the lowest possible value of the collector voltage? The highest?

SEC. 8-5 OTHER TYPES OF BIAS

8-16 Does the collector voltage increase, decrease, or remain the same in Fig. 8-23 for small changes in each of the following?

a. R_1 increases
b. R_2 decreases
c. R_E increases
d. R_C decreases
e. V_{CC} increases
f. β_{dc} decreases

8-17 Does the collector voltage increase, decrease, or remain the same in Fig. 8-25 for small increases in each of the following circuit values?

a. R_1
b. R_2
c. R_E
d. R_C
e. V_{CC}
f. β_{dc}

Figure 8-23

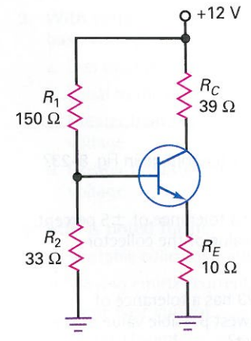


Figure 8-24

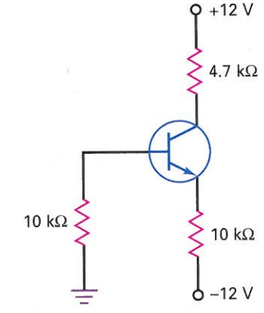
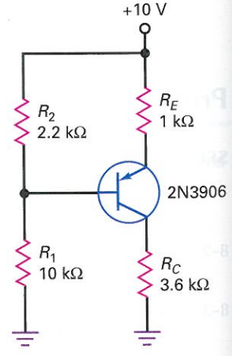


Figure 8-25



SEC. 8-6 TROUBLESHOOTING

8-18 What is the approximate value of the collector voltage in Fig. 8-23 for each of these troubles?

a. R_1 open
b. R_2 open
c. R_E open
d. R_C open
e. Collector-emitter open

8-19 What is the approximate value of the collector voltage in Fig. 8-25 for each of these troubles?

a. R_1 open
b. R_2 open
c. R_E open
d. R_C open
e. Collector-emitter open

SEC. 8-7 *PNP* TRANSISTORS

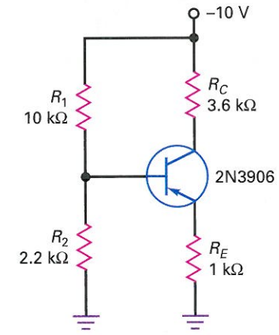
8-20 What is the collector voltage in Fig. 8-25?

8-21 What is the collector-emitter voltage in Fig. 8-25?

8-22 What is the collector saturation current in Fig. 8-25? The collector-emitter cutoff voltage?

8-23 What is the emitter voltage in Fig. 8-26? The collector voltage?

Figure 8-26



Critical Thinking

8-24 Somebody has built the circuit of Fig. 8-23, except for changing the voltage divider as follows: $R_1 = 150\ k\Omega$ and $R_2 = 33\ k\Omega$. The builder cannot understand why the base voltage is only 0.8 V instead of 2.16 V (the ideal output of the voltage divider). Can you explain what is happening?

8-25 Somebody builds the circuit of Fig. 8-23 with a 2N3904. What do you have to say about that?

8-26 A student wants to measure the collector-emitter voltage in Fig. 8-23, and so connects a voltmeter between the collector and the emitter. What does it read?

8-27 You can vary any circuit value in Fig. 8-23. Name all the ways you can think of to destroy the transistor.

8-28 The power supply of Fig. 8-23 has to supply current to the transistor circuit. Name all the ways you can think of to find this current.

8-29 Calculate the collector voltage for each transistor of Fig. 8-27. (*Hint:* Capacitors are open to direct current.)

8-30 The circuit of Fig. 8-28*a* uses silicon diodes. What is the emitter current? The collector voltage?

8-31 What is the output voltage in Fig. 8-28*b*?

8-32 How much current is there through the LED of Fig. 8-29*a*?

8-33 What is the LED current in Fig. 8-29*b*?

8-34 We want the voltage divider of Fig. 8-22 to be stiff. Change R_1 and R_2 as needed without changing the *Q* point.

Figure 8-27