

Figure 17-34

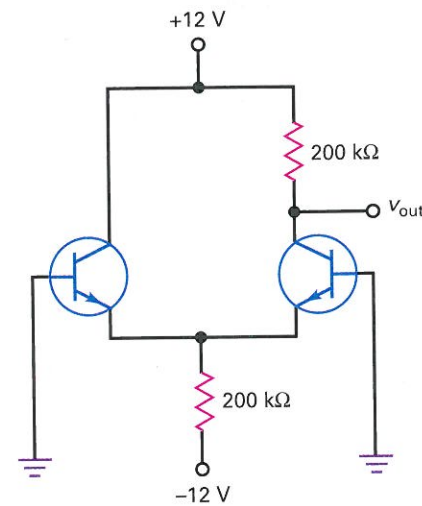


Figure 17-36

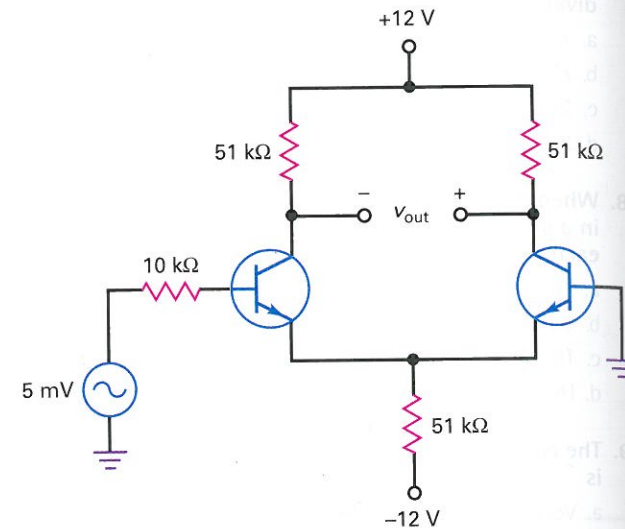


Figure 17-35

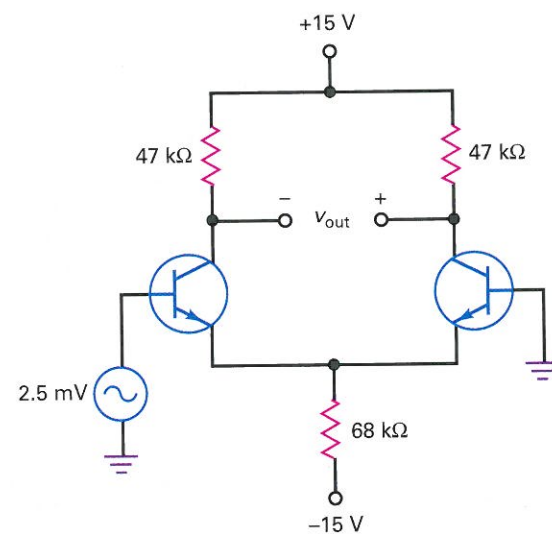
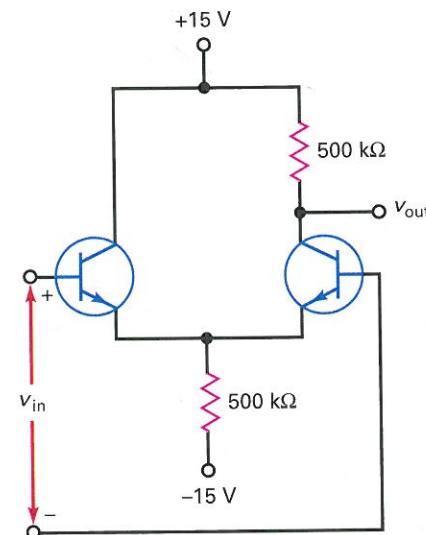


Figure 17-37



Troubleshooting

17-17 Somebody builds the diff amp of Fig. 17-35 without a ground on the inverting input. What does the output voltage equal? Based on your preceding answer, what does any diff amp or op amp need to work properly?

17-18 In Fig. 17-34, 20 kΩ is mistakenly used for the upper 200 kΩ. What does the output voltage equal?

Critical Thinking

17-20 In Fig. 17-34, the transistors are identical with $\beta_{dc} = 200$. What is the output voltage?

17-21 What are base voltages in Fig. 17-34 if each transistor has $\beta_{dc} = 300$?

17-19 In Fig. 17-34, V_{out} is almost zero. The input bias current is 80 nA. Which of the following is the trouble?

- Upper 200 kΩ shorted
- Lower 200 kΩ open
- Left base open
- Both inputs shorted together

17-22 In Fig. 17-38, transistors Q_3 and Q_5 are connected to act like compensating diodes for Q_4 and Q_6 . What is the tail current? The current through the active load?

Figure 17-38

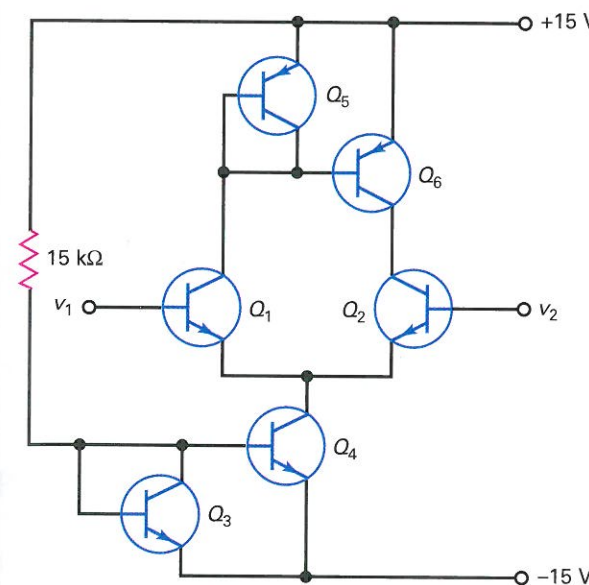
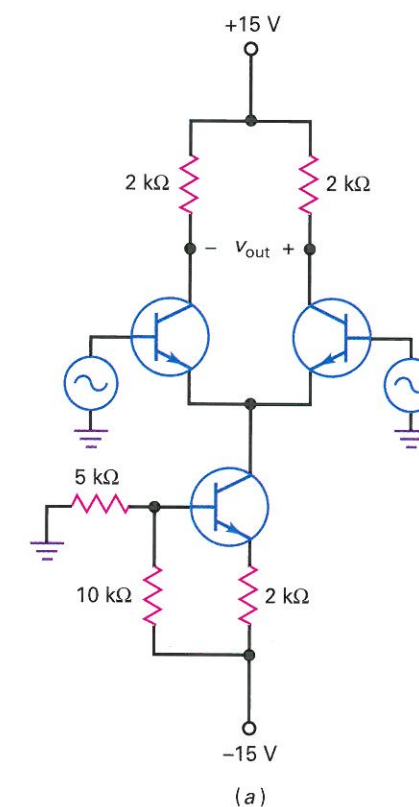


Figure 17-39

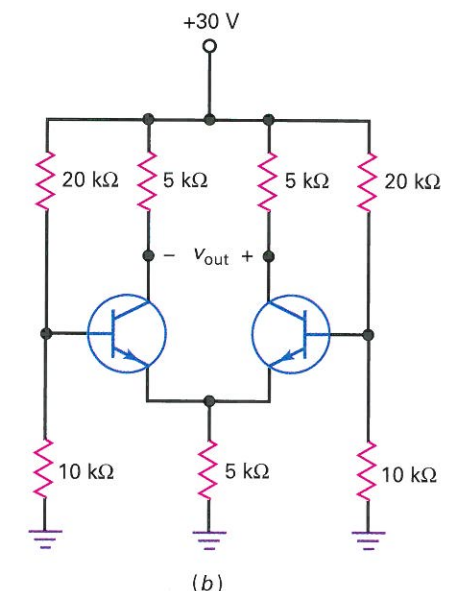


17-23 The 15 kΩ of Fig. 17-38 is changed to get a tail current of 15 μ A. What is the new value of resistance?

17-24 At room temperature, the output voltage of Fig. 17-34 has a value of 6.0 V. As the temperature increases, the V_{BE} of each emitter diode decreases. If the left V_{BE} decreases 2 mV per degree and the right V_{BE} decreases 2.1 mV per degree, what is the output voltage at 75°C?

17-25 The dc resistance of each signal source in Fig. 17-39a is zero. What is the r_e of each transistor? If the ac output voltage is between the collectors, what is the voltage gain?

17-26 If the transistors are identical in Fig. 17-39b, what is the tail current? The voltage between the left collector and ground? Between the right collector and ground?



Up-Down Circuit Analysis

17-27 In Fig. 17-40, predict the response of each dependent variable in the rows labeled I_{B1} and I_{B2} .

17-28 In Fig. 17-40, predict the response of each dependent variable in the rows labeled R_E and R_C .

17-29 In Fig. 17-40, predict the response of each dependent variable in the row labeled V_{CC} .