

EE112 Analog Integrated Circuits I

Homework 5

Due: Nov. 10th before lecture

Read the chapter 6.

- In a particular technology, a small BJT operating at $v_{BE} = 30V_T$ conducts a collector current of $200 \mu\text{A}$. What is the corresponding saturation current? For a transistor in the same technology but with an emitter junction that is 32 times larger, what is the saturation current? What current will this transistor conduct at $v_{BE} = 30V_T$? What is the base-emitter voltage of the latter transistor at $i_C = 1 \text{ mA}$? Assume active-mode operation in all cases.
- A *pnp* transistor has $v_{EB} = 0.7 \text{ V}$ at a collector current of 1 mA . What do you expect v_{EB} to become at $i_C = 10 \text{ mA}$? At $i_C = 100 \text{ mA}$?
- For each of the circuits shown in Fig. 1, find the emitter, base, and collector voltages and currents. Use $\beta = 50$, but assume $|V_{BE}| = 0.8 \text{ V}$ independent of current level.

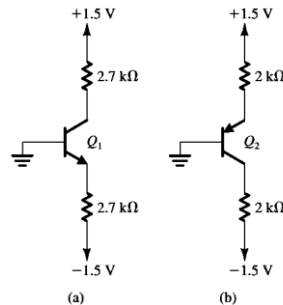


Figure 1

- For the circuits in Fig. 2, find values for the labeled node voltages and branch currents. Assume β to be very high.

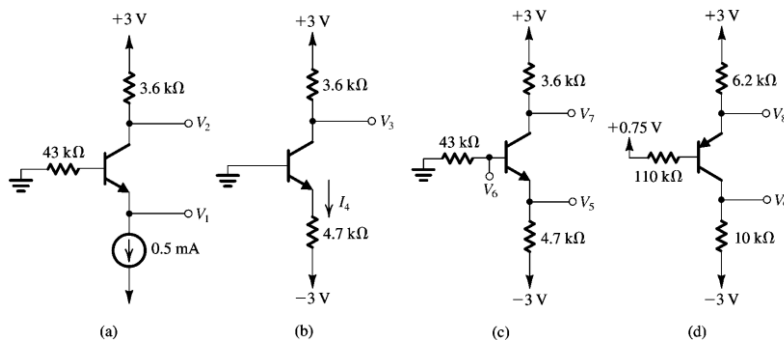


Figure 2