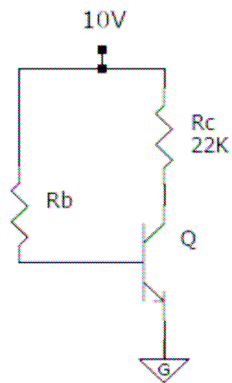


Physics 517/617 Homework 4 (Oct 27th)

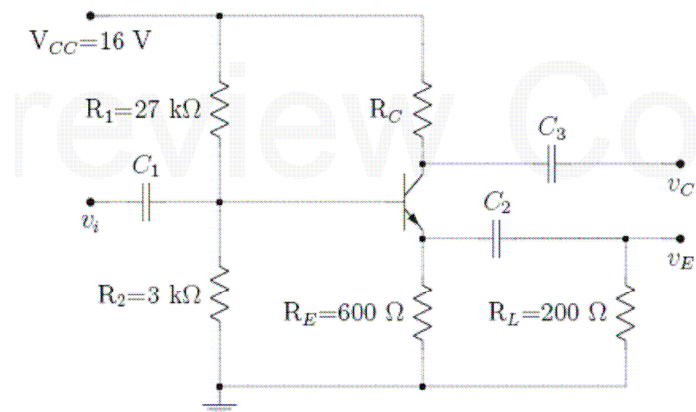
Problems biasing Transistors (you can make standard approximations, e.g. $V_{BE}=0.7V$)

- 1) In the circuit below, the transistor has a $\beta=200$. Calculate R_B so that the transistor is biased with $V_{CE}=5V$.



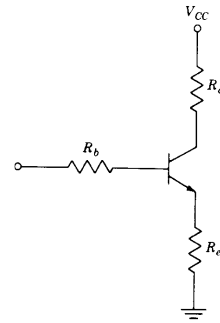
- 2) Diagram 5.59 from your book is shown below. The transistor $\beta=100$.

- a) Calculate a resistance R_C such that the transistor is biased with $V_{CE}=8V$.
b) What is the voltage at the base input into transistor?



3) (Millman 3-15) The silicon transistor shown has an $h_{fe} = 100$. Let $V_{CC} = 20\text{ V}$, $V_{BB} = 10\text{ V}$, $R_b = 40\text{ K}\Omega$, $R_c = 15\text{ K}\Omega$, and $R_e = 5\text{ K}\Omega$.

- Assume that Q is in the active region and find I_B and I_C .
- Verify that the assumption in part (a) is not correct. Explain briefly.
- Assume that Q is in saturation and find I_B and I_C .
- Verify that the assumption in part (c) is justified. Explain briefly.



Prob. 3-15

- Use the 5SPICE program on the computers to simulate the output of the full wave rectifier you built in Lab3. You can leave the transformer out of the simulation. When you analyze the circuit with 5SPICE you will want to use the transient option.