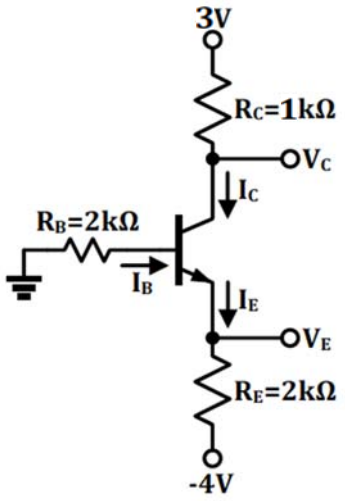
ECE 342: Electronic Circuits **Summer 2023**
Problem Set #7 **Professor Schutt-Aine**
Due Date: 5pm, Fri, Jul 14

1. Consider the NPN transistor circuit shown below. Given $V_{BE(on)} = 0.7V$, $V_{CE(sat)} = 0.2V$, $\beta = 100$.

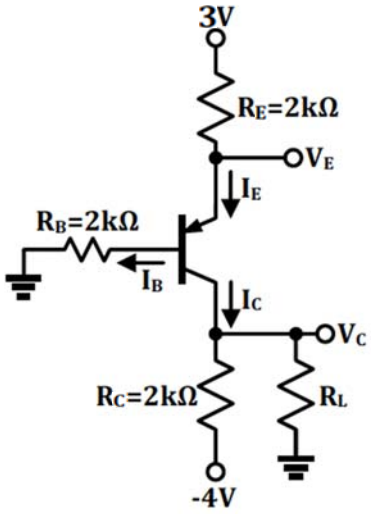


a) Find $I_B, I_C, I_E, V_C \; and \; V_E$

b) What is the region of operation? Why?

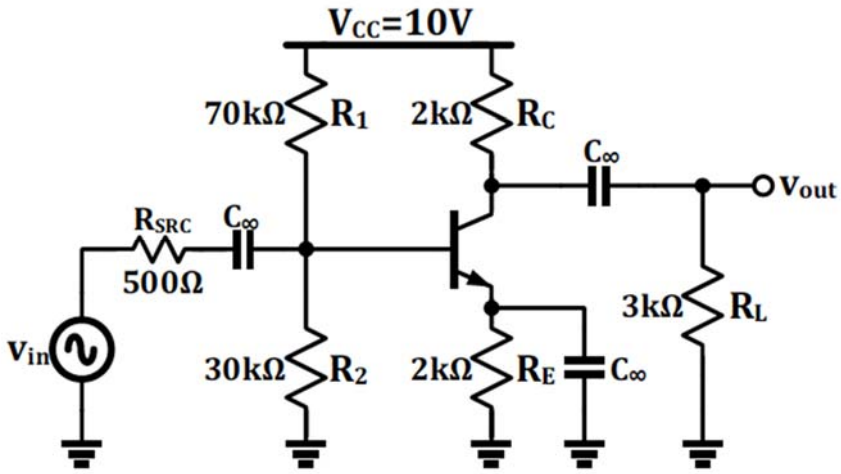
c) Find the maximum value of R_c so that it is the forward active region.

2. Consider the PNP transistor circuit below. Given $V_{EB(on)} = 0.7V, V_{EC(sat)} = 0.2V, \beta = 50 \; and \; R_L = 2.5k\Omega$.



a) Find $I_B, I_C, I_E, V_C, and\ V_E$.

b) What is the region of operation? Why?

c) What are the maximum and minimum values of R_L so that the transistor remains in the forward active region.

3. Given $V_{BE(on)} = 0.7V, \beta = 100, r_0 \rightarrow \infty$, determine the voltage gain $A_v = \frac{v_{out}}{v_{in}}$. Assume $V_T = 25mV$.