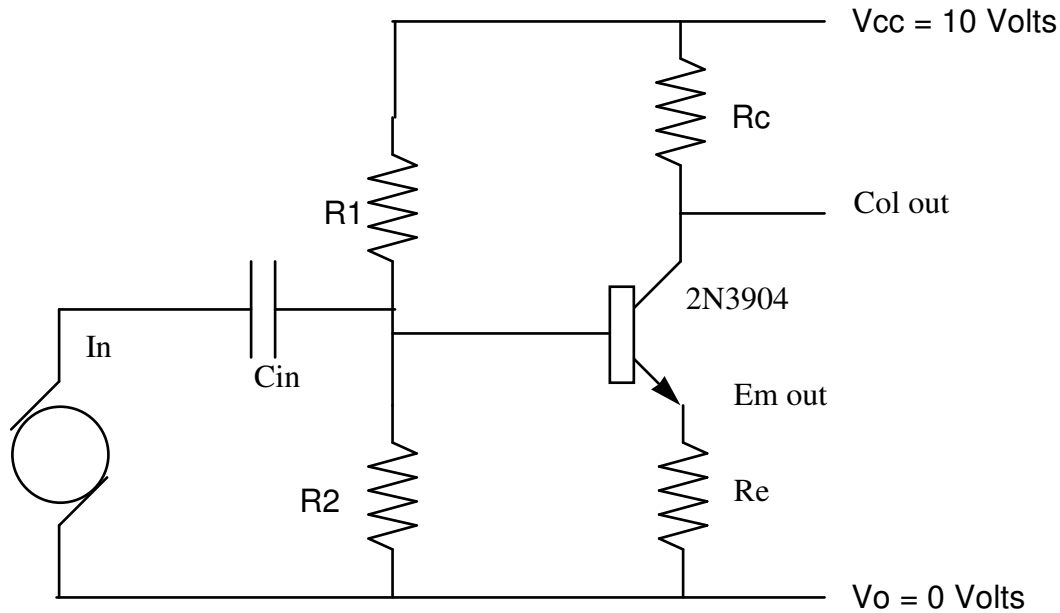


Problems 4



1.

Choose values of R_1 , R_2 , R_c and R_e to give 1 volt at the emitter and 5 volts at the collector for a typical beta transistor with 1 mA collector current at room temperature, and state them. What is the collector voltage with your values for a minimum typical device, a maximum current gain device, and at 100 °C for a typical device? Estimate the maximum range of collector voltage, for a typical device at room temperature, which results from using 5 % tolerance resistors. Calculate the effect of changing V_{cc} to +15 Volts with no other changes in the circuit components. Will it still operate?

2.

Assume that a signal is fed to the base through an isolating capacitor in the above schematic with 10 volt supply and your calculated resistor values. What is the voltage gain, for small sine wave signals, to the collector as output? What is it to the emitter? What is the input impedance of the circuit? What size of isolating capacitor is needed to ensure only a 3 db signal loss at 1 kHz? Does this represent a low pass filter or a high pass filter? What is the output impedance at the emitter and at the collector? Are they affected by the source resistance?