Prelab 7 – Frequency response – Due at the beginning of lab!

It wouldn’t be a bad idea to build this circuit before you show up in lab.

1. For the common emitter amplifier above, with \( R_C = 10k \), \( R_E = 1k \), \( R_2 = 100k \), and \( V_{CC} = 10V \),
   a. choose \( R_1 \) such that the output bias voltage is roughly 5--6V.
   b. calculate \( g_m \) and \( G_M \)
   c. estimate the low frequency gain from \( v_b \) to \( v_c \).

2. Calculate the pole frequency of the input pole, \( \omega_{p, in} \), assuming \( C_1 = 0.1uF \). Sketch the magnitude of the gain (which is less than 1) from \( v_{in} \) to \( v_b \). Label the pole frequency.
3. Calculate the pole frequency of the emitter impedance pole, $\omega_{p,E}$ assuming $C_E=0.1\text{uF}$
   a. Find the frequency, $\omega_{p,GM}$, at which the magnitude of the emitter degeneration impedance is equal to $1/g_m$
   b. Plot the magnitude of the emitter impedance vs. frequency

4. Calculate the pole frequency of the output pole, assuming that $C_{\text{load}}=100\text{pF}$
   a. Plot the magnitude of the output impedance and the overall gain $v_{\text{in}}$ to $v_{\text{out}}$