PHYS 4211 Instrumentation HW 2

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1. Design a common emitter amplifier of nominal gain $g = -10$ to work at $f = 100\,\mathrm{kHz}$. Let the supply voltages $V_{CC} = \pm 12\,\mathrm{V}$. Center the output voltage as best you can. Use capacitive coupling and set the quiescent current at $1.0\,\mathrm{mA}$.

2. Now see if you can build a circuit that has a nominal gain $g = +100$ with the same V_{CC}, same quiescent current in the output stage, and works at the same frequency. Simply stringing the input of the above circuit into the input of the same circuit won't quite work. However, the addition of a small intermediate circuit will do the trick. Take it from there.

3. See if you can construct a single-stage common emitter amplifier that has a maximum gain $g \simeq -100$ at $f_0 = 10\,\mathrm{kHz}$ and that falls off rather sharply for frequencies on either side of f_0. For specificity, you can use the same V_{CC} and quiescent current as above and the output need not be centered. Hint: Think about the impedances of an L in series with a C. You *could* choose $C = 0.01\,\mu\mathrm{F}$ and $L = 25\,\mathrm{mH}$. Take it from there.