

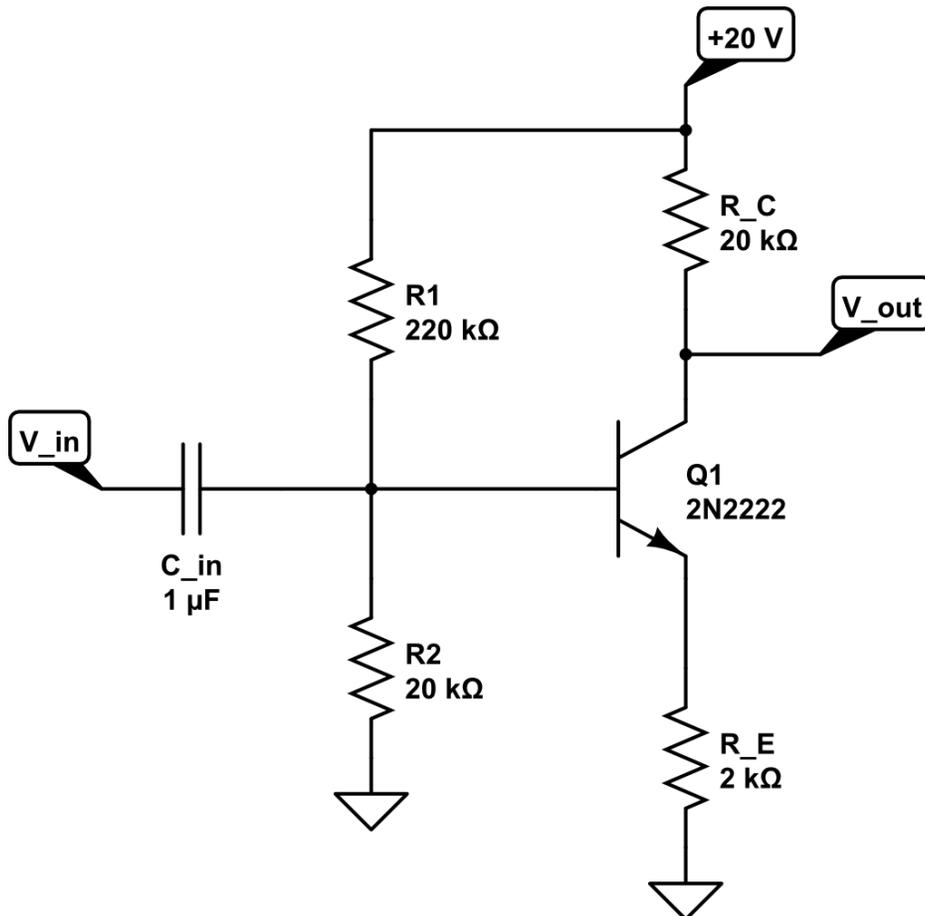
Lab 7 Transistor AC Amplifier

Objectives:

- Construct a simple AC amplifier using a signal transistor and discrete components.
- Analyze the circuit to verify component value selection.
- Measure the frequency dependent gain for the amplifier

I. Using the powered breadboard, construct the following circuit. Use the variable positive power supply on the breadboard to supply the +20 V (if it doesn't quite reach 20 V, that's ok; just set it to its maximum and record the value).

1. You'll have to use multiple resistors (1k Ω , 10k Ω , 100k Ω) to construct the resistor values shown. Measure the resistance of each combination and record those values. Note that you should not measure resistor values while the resistors are connected to the circuit, so be sure to remove the extreme ends of the resistor combinations before you connect the DMM. Notice also that your transistor may not be a 2N2222. A 2N4401 or 2N3904 will also work.
2. With power applied to the circuit, carefully measure the voltage across R_C and R_E , from which you can calculate I_C , I_E , and I_B . Measure the voltage at the base of the transistor and record all those values. Make sure all the values are reasonable and make sense to you.



II. Using the function generator (with the amplitude turned down pretty low), apply a sinusoidal voltage to the input capacitor. Using the digital oscilloscope, measure the input voltage amplitude and the output voltage amplitude and the phase relationship between the two signals. Calculate the gain of the amplifier (V_{out}/V_{in}) over a broad range of frequencies.

III. Being careful of the correct polarity, add a 10 μ F capacitor in parallel with R_E and repeat the measurements in part II.

IV. Write a clear, concise report explaining what you measured, how you analyzed it, and what conclusions and generalizations you can make from your analysis.