Experiment #9 -Prelab ENEE2103

Multistage Amplifiers and Frequency Response

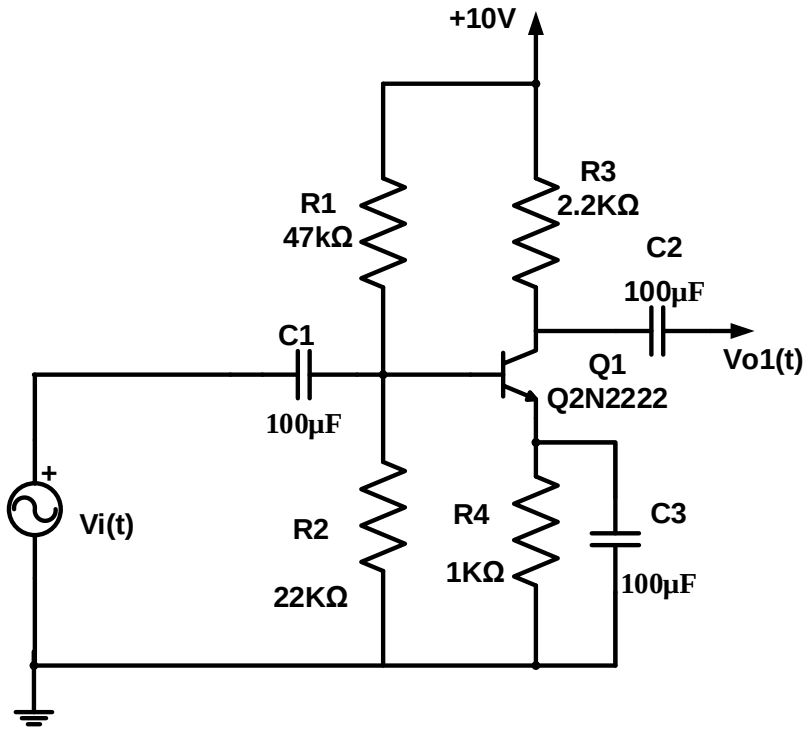
Pre-lab

You have to use PSPICE simulation for the multistage amplifier circuit to get the DC operating point, voltage gain and frequency response.

Procedure:

I. MULTISTAGE AMPLIFIER Bias and Transient Simulation.

A. Use the following first amplifier stage and perform the following simulations:

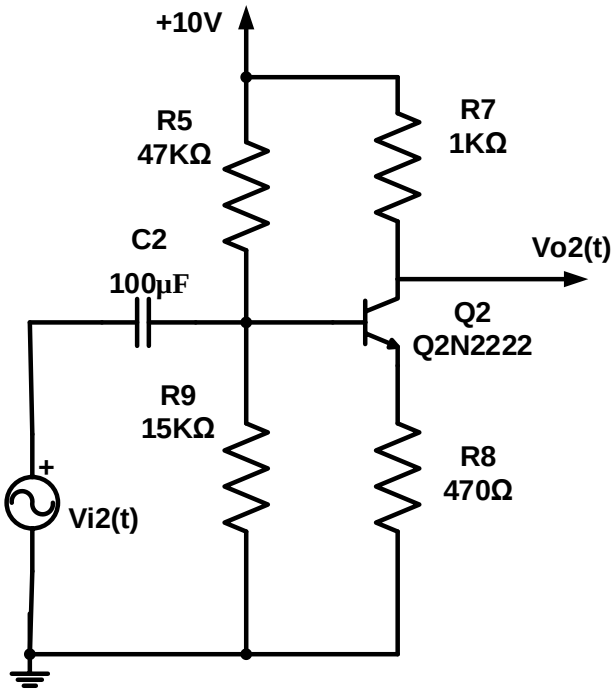


- DC bias with ➔ Measure V_{B1}, V_{E1}, V_{CE1}

- Transient Analysis ➔ Adjust Vi(t) to 12.5mVp-p at f = 1 kHz.

- Measure the output from the first stage, and calculate Av1=Vo1/Vi

B. Use the following second amplifier stage and perform the following simulations:

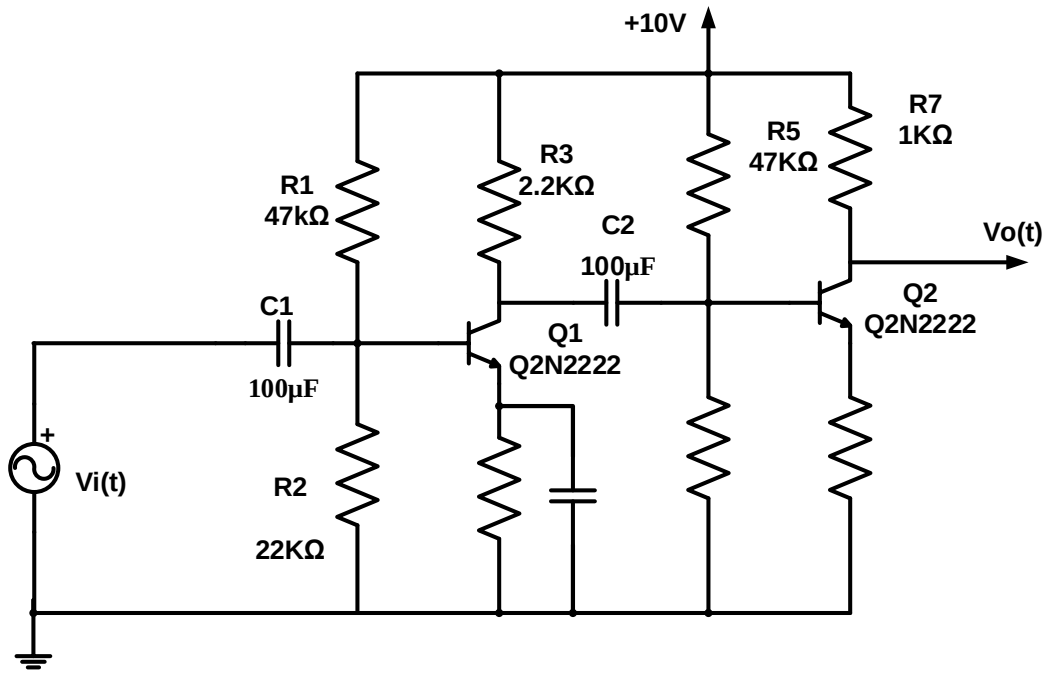


- DC bias ➔ Measure V_{B2}, V_{E2}, V_{CE2}

- Transient Analysis ➔ Adjust the generator output Vi2 to 1.25Vp-p at f = 1 kHz.

- Measure the output from the second stage, and calculate Av2=Vo2/Vi2

C. Connect both stages in cascade, i.e. output of first stage connected as an input to second stage with 100uF decoupling Capacitor and perform the following simulations:



- DC bias with Vcc=10 V ➔ Measure V_{B1}, V_{E1}, V_{CE1} and V_{B2}, V_{E2}, V_{CE2}

- Transient Analysis ➔ Adjust the generator connected to the input of first stage to 12.5mVp-p at f = 1 kHz and measure the output from the second stage.

- Calculate Av=Vo/Vi and compare to Av=Av1*Av2 from previous simulations

II. FREQUENCY RESPONSE Simulations

1. For the same multistage circuit of part I
2. Use an ac source with magnitude= 1V instead of the sine wave ,
3. Run ac sweep (decade type) and plot the magnitude of Vo in dB's
4. Estimate the cut0ff frequencies from the plot