TOTAL: _____/10

ECE 651: Electronic Design II

Homework #2

Due: Monday, September 18th, 2023

Student Name: _____

Note: Please use this as a cover page for your paper submission.

1. For the following BJT amplifier circuit, choose the resistor values R_1 and R_2 such that the amplifier is biased near the optimal operating point (i.e., near the center of the linear region of the voltage transfer characteristic curve). Simulate your designed circuit on Multisim to confirm your result. For BJT, use the NPN silicon transistor (model: 2N2222A).

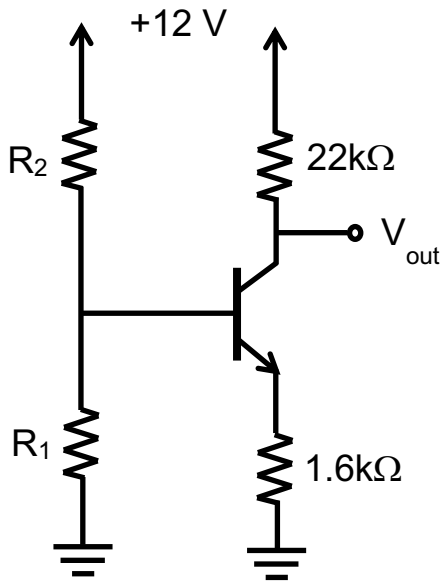

Figure 1. A BJT amplifier with a 4-resistor biasing network.

2. Repeat problem 1 for the following FET-based amplifier circuit. For FET, use the n-channel MOSFET (model: 2N7000)

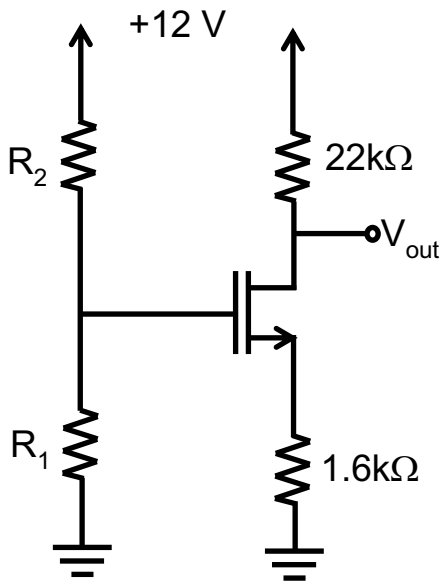

Figure 2. An FET-based amplifier with a 4-resistor biasing network.

(a) For each amplifier circuit, include the following:
- Include your handwritten work showing how you arrived at the R_1 and R_2 values that you've chosen.
- Plot the Voltage Transfer Characteristic (VTC) curve showing V_{out} vs. V_{in}. Indicate the optimal operating point on the plot.
- Show the simulation results of the circuits in Figure 1 and Figure 2 as validation.

Note:
- Make sure that each axis is properly labeled (e.g., V_{out}, I_C, etc.) and units (e.g., mA, V, etc.) must be provided.
- For submission, convert your worksheets (including this cover page with your name) into a PDF format and submit electronically on Canvas.
- Also, submit your Multisim files (file extension: .ms14) along with your PDF worksheets.