

## Project #3 Multistage Amplifiers

**DUE:** PSpice Simulations      *Friday 4/17/2009 by 5pm*

Circuit Demonstration      *Week of 4/20/2009 by end of lab session*

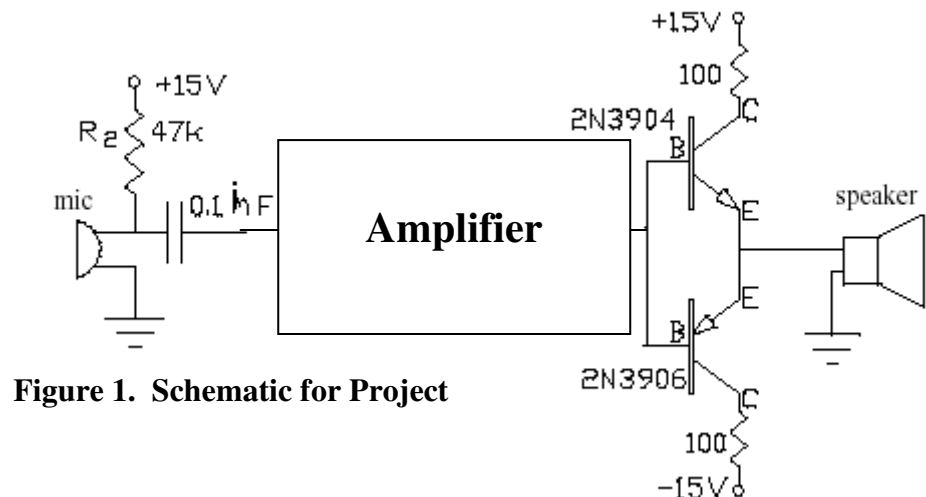
- ✓ Do your own work.
- ✓ Clearly present your work.
- ✓ All printouts must be readable.

### **OBJECTIVES:**

- Design a multi-stage amplifier
- Establish a dc bias point(s) by selecting appropriate values
- Design for a large gain, low output impedance, and high input impedance
- Investigate the frequency response of a multistage amplifier

### **REQUIREMENTS:**

- Design a multi-stage amplifier as shown in **Fig. 1** as 'Amplifier' box.
- You need to have enough gain to amplify your voice signal to hear it at a normal level out of the speaker. (It must not sound like a whisper.)
- You will need to have enough power to drive the speaker.
- You cannot have any clipping or distortion.
- Your low frequency 3dB should be less than 100Hz.
- You need to use at least 1 BJT amplifier (any configuration).
- You need at least two stages for the amplifier (suggest using a common collector as last stage).



**Figure 1. Schematic for Project**

## **Hints:**

- You can use your MosFet amplifier(s) from the previous project if you desire.
- To aid in solving for unknown variables, you may want to use Matlab. You will still have to pick several values arbitrarily. Matlab just makes it easier to adjust variables without having to solve all the equations again.
- Be careful about the power rating of your components and the current that you choose for your bias location. Remember that  $I^2R$  is the power through a resistor. Each component also has a maximum power and/or current rating for it. Do not exceed these values or the component will “blow”.