Lab 10/11 Report Rubric

0. Title Block (top of first page)

Names, Group number, Course (Day), Due Date, Lab Number/Title
For example:
Benjamin Franklin & George Washington
Group 1
ESE206 (Tuesday)
April 25, 2012
Labs 10/11: MOSFETS – H-Bridge and Common Source Amplifier

1. Introduction (10pts)

a. Goals of the lab (what was intended, what was accomplished; summary form).

2. Theory (30pts)

a. Talk about the theory of MOSFETs. Discuss both modes of operation for these FETs. Remember, these two labs are very connected so your report should reflect that.

b. You should include here the theory of operation: briefly talk about the various electrical properties that were important in the lab; provide relevant equations and sample calculations, if necessary.

c. Your pre-lab should also be included in this section. For the two labs, the pre-lab was an important factor consisted of calculations of your ideal circuit. Therefore, these calculations should be included in this section. Include Multisim of Lab 11 in place of Prelab 3.4.

d. Ideal circuit behaviors: what should happen assuming ideal conditions.

e. Implementation: schematics of circuits, what each circuit did, what various components did (e.g. why was an op-amp necessary or what function did it provide).
Note: For this lab report, here is what we are looking for in the Theory section:

i. General idea of why MOSFETS are important and their use(s).

ii. Discuss how the transistors in the H-Bridge can power the motor, and the mechanisms that control direction and speed.

iii. Discuss the theory of biasing a transistor and why you do so in this manner.

iv. Discuss the theory behind using the transistor as an amplifier and the small signal model.

v. Discuss the circuit implementation and what each portion of the circuit was representing (i.e. which capacitor acted as a high-pass filter)

vi. Include the circuit schematics. Please make this yourself using a circuit-drawing tool (see guidelines). You do not have to include any protoboard layouts or pictures of your protoboard.

3. Experimental Results (25pts)

a. All data gathered in the lab, presented in a neat and organized fashion

b. Actual (i.e. measured) and nominal (i.e. what it’s supposed to be) values for all components (resistors, capacitors, inductors, potentiometers, etc.)

c. Any graphs, tables, or charts necessary to convey your information Note: Please display any voltage in/out versus frequency data in both table format AND logarithmically-scaled graph format.

4. Discussion and Conclusion (30pts)
a. This section should be ONE combined discussion of the two labs. You must include:

i. Discussion of results

ii. Deviation in your results from expected values and goals

iii. Problems that arose and how they were solved (or why they were ignored)

iv. Possible sources of error and what effect they might have had

b. Things to consider in your discussion:

i. All the items in the theory section and how they compared to your results.

ii. What are the advantages and disadvantages of building the H-Bridge with six transistors?

iii. Discuss any potential flaws with the circuit design you implemented.

iv. Performance of your Common-Source amplifier – DC and AC. How did the bypass capacitors affect this?

v. What was your frequency response for the amplifier? How did the bypass capacitors affect this?

vi. What types of distortion did you see for this amplifier? In those cases, what did the FFT show?

vii. Did input or output loading affect this circuit? Explain.

5. Writing Component (5 pts)

a. Organization (1pt)

b. Graphic elements (schematics, graphs, tables), including captions (2pts)

c. Wording, grammar & mechanics (2pts)

6. BONUS (20 pts)

Your bonus section should be completely separate from your main lab report. It will be up to you to decide what you need to include in this section, however you should follow a similar pattern to your main lab report. You do not need to make this section overly lengthy. Think about why we set up the circuit in this manner!