Lab 6 Grading Standard:

1) *In grading, do not explicitly assign points to the various sections. Rather, take points off for incorrect, incomplete or missing items.*
2) *When you take point off, be sure to write a short comment as to why the points were lost.*
3) *Example: (-1) What is the measured value of the component?*
   (-3) What is the mathematical formula that you are plotting on top of your data?

General Notes:

- The axis of all plots must be labeled. This should include the quantity, the units and numerical values.
- The boxed questions should be answered in the lab book.
- Procedures must have a circuit diagram.
- Measured values of components used should be recorded in the lab book.
- Relevant formulas should be included in the lab book.
- Formulas for computed quantities in tables should be near the table in the book.

Failure to measure a component value when possible (max -1 per occurrence)
Missing units on components, plot axes, tables … (-1 per occurrence).
Missing plot (-4 per occurrence).
Missing axes labels on plots (-1 per label).
Missing column labels on tables (-1 per label).
Missing formula for computed quantity in table (-1 per table)--can be in column title
Missing important formulas (-2 per occurrence)
No fit to linear curves (-2 per occurrence).
No fit values with units (-2 per occurrence).
No comparison of fit values with expectations when possible (-2 per occurrence).
Missing theoretical calculations, including formulas (-3 per occurrence).
Failure to answer questions (-2 per question, maximum of -10)

Pre-lab Signature: 10
Purpose/Introduction 5

There should be a two to five line description of what they are going to do in this lab. This is all or nothing for five points.

The IV curve of the 1N4004 Diode:

Procedure: 5
There should be a several line procedure that shows the circuit, indicates where they are going to measure voltages, what the measured values of the components are.

Data: 5

The data need to be plotted on an IV curve

Analysis: 10
Fit the diode IV curve to the Shockley equation to obtain m and Is.

The Clamp Circuit:

Procedure: 5
The procedure should include circuit diagrams, measured values of components and a description of what they are going to do.

Data: 10
There should be an IV curve for the data.

Analysis: 10
An estimate should be provided for both the diode voltage drop, Vd and the output resistance of the clamp circuit. Include the relevant formulas.

The Voltage Doubler:

Procedure 5

Data: 10
Measure both the IV curve at 1kHz and the frequency dependence for a 220k-Ohm load.

Analysis: What is the output impedance of the doubler? Include the relevant formulas.

The Voltage Multiplier:

Procedure: 5

Data: 10
Produce IV curves for the three frequencies.

Analysis: 10
What are the output impedances for the three frequencies? These do not agree with the expected values, probably because the diode-drop voltage changes in an unclear way. The fact that something funny is going on is obvious by the curved shape of the IV curve. Include the relevant formulas.

Questions 10

Conclusion/Summary 5