Name: _____ Date: _____ Course: _____ Professor: _____

# T17a: Introduction to Thermodynamics


**Your professor might not be able to cover the material related to this experiment until the last week of classes. Therefore, many of you will do the experiment before the material will be covered in a lecture. Make sure to read the description of the lab and appropriate portions of Chapters 17-18 of your textbook very carefully. Then answer the questions provided below.**

1. Write down the ideal gas law as an equation, explain the meaning of each term in the equation, and provide SI units for each variable.

2. Write down the First Law of Thermodynamics.

3. Write down the Second Law of Thermodynamics in its thermal engine efficiency statement.

4. Write down the equation you are going to use to find the thermal efficiency of a reverse Otto cycle analyzing Data table 4.

5. Explain what the adiabatic constant $\gamma$ is.

6. For the Otto Cycle, write down the equation you will need to use for the calculation of the efficiency in Data table 5, using the compression ratio.

7. Briefly describe an adiabatic, an isovolumetric, an isobaric and an isothermal processes.

8. Write down an expression for the internal energy of a diatomic ideal gas in terms of temperature and required constants.

9. Using the NIST Database provided in your lab instructions, calculate (show your work):

a) Molar mass of Air

b) Air Heat Capacity at Constant Volume

c) Air Heat Capacity at Constant Pressure