ASSIGNMENT 8

CHEMISTRY 200

Due: 4:30 pm Monday 6 November 2006

The Heat Capacity Assignment

1. In the previous chapter, a statement of the first law was:

$$\Delta U = w_{ad} \quad \text{and} \quad dU = đw_{ad}.$$

The complete differential of U is:

$$dU = \left(\frac{\partial U}{\partial T}\right)_V dT + \left(\frac{\partial U}{\partial V}\right)_T dV$$

where

$$\left(\frac{\partial U}{\partial V}\right)_T = T\left(\frac{\partial p}{\partial T}\right)_V - p.$$

Use these to find an expression relating the initial temperature and volume of a perfect gas to the final temperature and volume of a perfect gas undergoing adiabatic reversible work. The heat capacity at constant volume of a perfect gas is $C_V = \frac{3}{2}nR$.

2. Do question 2 on page 416 of your text.

3. Do question 4 on page 416 of your text.

4. Do question 6 on page 416 of your text.

5. Do question 8 on page 416 of your text.

6. Do question 10 on page 416 of your text.