20.110/2.772/5.601 Fall 2005

Recitation #1
9/13/2005

1. *(adapted from Gaskell 2.1)*A quantity of neon gas occupies 10 L at 10 atm and 100 K. Assuming neon behaves as an ideal gas, calculate (1) the final volume of the system, (2) the work done by the system, (3) the heat entering/leaving the system, and (4) the internal energy change if the system undergoes:

a. A sudden isothermal expansion to 1 atm
b. A reversible isothermal expansion to 1 atm.
c. A reversible adiabatic expansion to 1 atm.

2. One mole of nitrogen at 25^{o} C and 1 bar is expanded reversibly and isothermally to a pressure of 0.132 bar. (*SAB* 2.10)

a. What is the value of w?
b. What is the value of w if the nitrogen is expanded to the same volume as in part a against a constant pressure of 0.132

3. A mole of argon is allowed to expand adiabatically and reversibly from a pressure of 10 bar and a temperature of 298.15 K to a pressure of 1 bar. What is the final temperature and how much work is done or the argon? (*SAB* 2.18)

4. A tank contains 20 L of compressed nitrogen at 10 bar and 25^{o} C. Calculate w when the gas is allowed to expand reversibly to 1 bar (a) isothermally and (b) adiabatically. (*SAB* 2.19)