Quiz #3 Week: Sept. 27 -Sept. 29
Name _____ Chemistry 331

Equations and constants:
R = 8.31 J/mol-K = 0.08206 L-atm/mol-K

$$\delta w = -PdV \;,\; dU = \delta w \;,\; C_V = \frac{3}{2}nR \;,\; C_P = \frac{5}{2}nR$$

1. A. What is the work of expansion for an ideal gas from 10 L to 100 L against a constant pressure of 1 atm?

w = -PΔV = - (1 atm)(100L – 10L) = -90 L-atm
w = -90 L-atm * 1e-3 m^3/ dm^3 * 1.01325e5 Pa/ atm = 9119.25 Pa * m^3 = -9119 J

Answer in L-atm = _____.
Anser in Joules = _____.

B. How many moles of gas are there in the expansion in part A?

$P_1V_1 = P_2V_2 = nRT$
n = PV/RT = (10 atm * 10 L) / (.08206 L-atm/mol-K * 298K)
n = 4.09 moles

Moles of gas = _____.

C. What is the initial pressure in part A?

$P_1V_1 = P_2V_2$
P_1 (10 L) = (1 atm)(100 L)
P_1 = 10 atm

Pressure = _____.

2. In an adiabatic expansion a monatomic ideal gas cools from 300 K to 270 K. Determine the work of expansion.

dw = Cv*dT
w = 3/2*n*R*($T_2 - T_1$)
w = 3/2 * 4.09 * 8.314 J/mol-K * (270K – 300K)
w = -1530 J

Work = _____.