

Physics 102Rec  
Quiz#3  
Chapter 20

Name: Key Id: \_\_\_\_\_ Sect: \_\_\_\_\_

In a constant pressure process, heat is removed from one mole of oxygen gas (diatomic) initially at 200 °C. The final temperature of the gas is 100 °C. Calculate;

- (a) The work done during the process.  
(b) The change in internal energy of the gas.  
(c) The heat transfer during the process.

Constant Pressure Process ( $P = \text{Constant}$ )

$$a) \quad W = \int P \, dV = P \Delta V = P(V_f - V_i) = n R \Delta T$$

$$W = n R (T_f - T_i) = (1)(8.31)(-100) \\ = \boxed{-831 \text{ J}}$$

$$b) \quad \Delta E_{\text{int}} = n C_v \Delta T = (1) \left(\frac{5}{2} R\right) \Delta T$$

$$= (1) \left(\frac{5}{2} * 8.31\right) (-100)$$

$$= \boxed{-2076 \text{ J}}$$

$$c) \quad Q = n C_p \Delta T = n \left(\frac{7}{2} R\right) \Delta T$$

$$= (1) \left(\frac{7}{2} * 8.31\right) (-100) = \boxed{-2909 \text{ J}}$$

$$\underline{\underline{\text{check}}} : \Delta E_{\text{int}} = Q - W = -2909 + 831 = \underline{\underline{-2076 \text{ J}}}$$