

# Gas Laws Review - page 1

$$1a) 8.00g O_2 \left( \frac{1 \text{ mol } O_2}{32.00g} \right) \left( \frac{22.4L}{1 \text{ mol } O_2} \right) = \boxed{5.60L O_2}$$

$$1b) 8.00g O_2 \left( \frac{1 \text{ mol } O_2}{32.00g} \right) = 0.250 \text{ mol } O_2$$

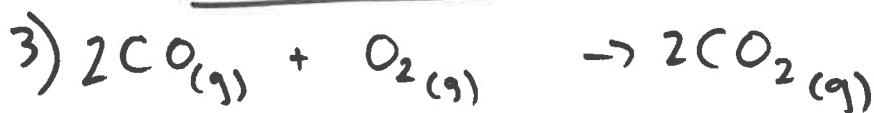
$$V = \frac{nRT}{P}$$

$$V = \frac{(0.250 \text{ mol}) \left( 0.0821 \frac{L \cdot \text{atm}}{\text{mol} \cdot K} \right) (450. K)}{1.5 \text{ atm}}$$

$$\boxed{V = 6.16L}$$

$$2) P = \frac{nRT}{V} = \frac{(1.35 \text{ mol}) \left( 0.0821 \frac{L \cdot \text{atm}}{\text{mol} \cdot K} \right) (320. K)}{2.50L}$$

$$\boxed{P = 14.2 \text{ atm}}$$



$$a) 10.0 \text{ mol } CO \left( \frac{2 \text{ mol } CO_2}{2 \text{ mol } CO} \right) \left( \frac{22.4L}{1 \text{ mol } CO_2} \right) = \boxed{224L CO_2}$$

$$b) 10.0 \text{ mol } CO \left( \frac{2 \text{ mol } CO_2}{2 \text{ mol } CO} \right) = 10.0 \text{ mol } CO_2$$

$$V = \frac{nRT}{P} = \frac{(10.0 \text{ mol}) \left( 0.0821 \frac{L \cdot \text{atm}}{\text{mol} \cdot K} \right) (298K)}{1.3 \text{ atm}}$$

$$\boxed{V = 188L CO_2}$$

$$4) \frac{70.90g}{1 \text{ mol } Cl_2} \left( \frac{1 \text{ mol } Cl_2}{22.4L} \right) = \boxed{3.17 \frac{g}{L}} \text{ } Cl_2 \text{ density at STP}$$

5) Charles' Law

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{0.750 L}{298 K} = \frac{0.500 L}{T_2}$$

$$T_2 = 199 K$$

6) Gay Lussac

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{4.50 atm}{293 K} = \frac{4.80 atm}{T_2}$$

$$T_2 = 313 K$$

7) Boyle's Law

$$P_1 V_1 = P_2 V_2$$

$$(0.974 atm)(125 mL) = (1.00 atm)(V_2)$$

$$V_2 = 122 mL$$

8) Combo

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{(1.00 atm)(75 mL)}{273 K} = \frac{(0.97 atm)(V_2)}{290 K}$$

$$V_2 = 82 mL$$

9) a)

$$n = \frac{PV}{RT} = \frac{(4.40 atm)(15.0 L)}{(0.0821 \frac{L \cdot atm}{mol \cdot K})(305 K)} = 2.64 \text{ mol } C_2H_4 \left( \frac{28.06 g}{1 \text{ mol } C_2H_4} \right) = 74.1 g C_2H_4$$

$$b) D = \frac{g}{L} = \frac{74.1 g}{15.0 L} = 4.94 g/L$$

10) a)  $4.00 L H_2 \left( \frac{2 L H_2O}{2 L H_2} \right) = 4.00 L H_2O \text{ vapor at STP}$

$$b) 5.00 g H_2 \left( \frac{1 \text{ mol } H_2}{2.02 g} \right) \left( \frac{2 \text{ mol } H_2O}{2 \text{ mol } H_2} \right) = 2.48 \text{ mol } H_2O$$

$$V = \frac{nRT}{P} \\ V = \frac{(2.48 \text{ mol})(0.0821 \frac{L \cdot atm}{mol \cdot K})(310 K)}{1.50 atm}$$

$$V = 42.1 L H_2$$