Gas Laws: Written by Students **Name**_____

n_1 V_1 $n_2 = 8.81 - 2.21 = 6.6\ mol$

1) A balloon contains 8.81 moles of air that occupies 9.95 L. If 2.21 moles of air are let out, what's the new volume? V_2

$PV = nRT$

$\frac{V_1}{n_1} = \frac{V_2}{n_2}$

$\frac{9.95\ L}{8.81\ mol} = \frac{V_2}{6.6\ mol}$

$\boxed{V_2 = 7.45\ L}$

$g_1 \rightarrow 16.5\ mol$ V_1 $527 - 200 = 327\ g \rightarrow 10.2\ mol\ O_2$

2) An oxygen tank contains 527 g of O_2 and occupies 9 liters. If 200 g of oxygen are let out after 50 minutes, what is the new volume? V_2 $PV = nRT$

$\frac{1\ mol\ O_2}{32\ g\ O_2} \mid \frac{527\ g\ O_2}{} = 16.5\ mol\ O_2$

$\frac{1\ mol\ O_2}{32\ g\ O_2} \mid \frac{327\ g\ O_2}{} = 10.2\ mol\ O_2$

$\frac{V_1}{n_1} = \frac{V_2}{n_2}$ $\frac{9\ L}{16.5\ mol} = \frac{V_2}{10.2\ mol}$

$\boxed{V_2 = 5.56\ L}$

P_1 V_1

3) At 6.53 atm, the volume of a blimp is 50 L. The pressure is reduced by 1.70 atm. What is the new volume? V_2 $P_2 = 6.53 - 1.7 = 4.83\ atm$

$P_1V_1 = P_2V_2$ $\frac{(6.53\ atm)(50\ L)}{4.83\ atm} = \frac{(4.83\ atm)(V_2)}{4.83\ atm}$

$\boxed{V_2 = 67.6\ L}$

$T_1 + 273.15 = 338.15\ K$ V_1 $T_2 + 273.15 = 380.15\ K$

4) At 65°C, a gas has a volume of 32.7 L. The temperature increased to 107°C. Assuming that the pressure is constant, calculate the new volume. V_2

$PV = nRT$

$\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\frac{32.7\ L}{338.15\ K} = \frac{V_2}{380.15\ K}$

$\boxed{V_2 = 36.8\ L}$

V_1 P_1 $V_2 = 0.470\ L$

5) Nancy has 1.01 L of helium at a pressure of 1.01 atm. If the helium is compressed to 470 mL, what is the new pressure of the gas? P_2

$P_1V_1 = P_2V_2$ $\frac{(1.01\ atm)(1.01\ L)}{0.470\ L} = \frac{P_2(0.470\ L)}{0.470\ L}$

$\boxed{P_2 = 2.17\ atm}$

6) The initial pressure of a balloon at 24°C is 173 atm. At 12°C, what would the pressure be?

$T_1 + 273.15 = 297.15\ K$ P_1 $T_2 + 273.15 = 285.15\ K$ P_2

$PV = nRT$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{173\ atm}{297.15\ K} = \frac{P_2}{285.15\ K}$

$\boxed{P_2 = 166\ atm}$

T_2 V_1 V_2

7) How hot will a balloon with a volume of 6.8 L have to get to obtain a volume of 187 L? The initial temperature is 25°C.

$T_1 + 273.15 = 298.15\ K$

$PV = nRT$

$\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\frac{6.8\ L}{298.15\ K} = \frac{187\ L}{T_2}$

$\boxed{T_2 = 8200\ K}$

P_2 $T_2 + 273.15 = 305.15\ K$

8) A gas has a pressure of 5 atm at 15°C. What will its pressure be at 32°C if the volume remains constant? P_1 $T_1 + 273.15 = 288.15\ K$

$PV = nRT$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{5\ atm}{288.15\ K} = \frac{P_2}{305.15\ K}$

$\boxed{P_2 = 5.29\ atm}$