AR Chemistry Notes: The Ideal Gas Law Name_____ M T 1 2 5

What can we change to a balloon? **Pressure, Temperature, Volume and NUMBER OF MOLES (n)**

Increase the moles of gas: Volume _____

Increase the moles of gas: Pressure _____

Where do moles go in the equation?

$$\frac{P\ V}{n\ T} = K$$

AND, We know that _____ mole of ANY gas at STP has a volume of _____

P =

V =

n = 1.00 mol

K = ??

T =

We now know the value of "K", So we change the value to 'R'

$$\frac{P\ V}{n\ T} = R =$$

What if we used mm Hg for pressure instead of atm???? R =

We Hate Fractions, So the equation is: PV = nRT

Example: You collect 127 Liters of CO_2 gas at 1.10 atm and a temperature of 20 C. How many moles of CO_2 did you collect?

P =
V =
g = n =
R =
T =

g ⟷ mol

How many grams of CO_2 did you collect?

AR Chemistry Notes: The Ideal Gas Law Name_____ M T 1 2 5

What can we change to a balloon? **Pressure, Temperature, Volume and NUMBER OF MOLES (n)**

Increase the moles of gas: Volume Increases – goes up

Increase the moles of gas: Pressure Increases – goes up

Where do moles go in the equation?

$$\frac{P\ V}{n\ T} = K$$

AND, We know that 1.00 mole of ANY gas at STP has a volume of 22.4 L

P = 1 atm

V = 22.4 L

n = 1.00 mol

K = ??

T = 0 C = 273 K

$$\frac{(1\text{ atm})(22.4\text{ L})}{(1\text{ mol})(273\text{ K})} = 0.0821\ \frac{\text{L atm}}{\text{mol K}}$$

We now know the value of "K", So we change the value to 'R'

$$\frac{P\ V}{n\ T} = R = 0.0821\ \frac{\textbf{L atm}}{\textbf{mol K}}$$

What if we used mm Hg for pressure instead of atm????

$$R = \mathbf{62.4}\ \frac{\textbf{L mm Hg}}{\textbf{mol K}}$$

We Hate Fractions, So the equation is: PV = nRT

Example: You collect 127 Liters of CO_2 gas at 1.10 atm and a temperature of 20 C. How many moles of CO_2 did you collect?

g =

P = 1.10 atm
V = 127 L
n = ??
R = 0.0821
T = O C = 273 K

P V = n R T

(1.10 atm) (127 L) = n (0.0821) (273 K)

$$n = \frac{(1.10\text{ atm})(127\text{ L})}{(0.0821)(273\text{ K})} = \mathbf{6.23\ mol\ CO_2}$$

g ⟷ mol

How many grams of CO_2 did you collect? $\mathbf{6.23\ mol\ CO_2} \times \frac{\mathbf{44.01\ g\ CO_2}}{\mathbf{1\ mol\ CO_2}} = \mathbf{274\ g\ CO_2}$