

10.62  $V=10\text{ L}$ ,  $51.2\text{ g O}_2 + 32.6\text{ g He}$ ,  $19^\circ\text{C}$   $292\text{ K}$

Calc.  $P_{\text{O}_2}$ ,  $P_{\text{He}}$  and  $P_T$

$n_{\text{O}_2} = \frac{51.2\text{ g O}_2}{32\text{ g O}_2} = 1.6\text{ mole O}_2$   $PV = nRT$

$n_{\text{He}} = \frac{32.6\text{ g He}}{4\text{ g He}} = 8.15\text{ mole He}$   $P_{\text{He}} = 19.5$

$P_{\text{O}_2} V = n_{\text{O}_2} RT$   
 $P_{\text{O}_2} = \frac{(1.6)(0.08206)(292)}{10} = 3.83\text{ atm}$   $P_T = 23.36\text{ atm}$

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$P_{\text{O}_2} = X_{\text{O}_2} P_T$

$3.83 = \frac{1.6}{9.75} (P_T)$

$P_T = 23.36\text{ atm}$

$X_{\text{O}_2} = \text{Mole fraction } \frac{n_{\text{O}_2}}{n_T}$   
 $\frac{1.6\text{ mole O}_2}{8.15\text{ mole He} + 1.6\text{ mole O}_2}$   
 $9.75\text{ mole Total}$

Dec 7-7:37 AM

10.43 Roach  $\frac{0.08\text{ km}}{\text{hr}}$ ,  $\frac{0.8\text{ ml O}_2}{\text{hr} \times \text{g}}$   $1\text{ atm } P$   
 $24^\circ\text{C } T$

$PV = nRT$

Q 5.2g roach, 1hr,  $\frac{0.08\text{ km}}{\text{hr}}$   $? \text{ mole O}_2 \text{ used}$

$\frac{0.8\text{ ml O}_2}{\cancel{\text{g}}} \times \frac{5.2\text{ g}}{\cancel{\text{g}}} \times \frac{1\text{ hr}}{\cancel{\text{hr}}} = 4.16\text{ ml O}_2 \text{ used}$   $V$

$n = \frac{PV}{RT} = \frac{(1)(4.16 \times 10^{-3}\text{ L})}{(0.08206)(297)} = 1.71 \times 10^{-4}\text{ mole}$   $\frac{\text{mole}}{\text{hr}}$

Dec 7-8:10 AM

ⓑ 1gt airtight jar

$\frac{1 \text{gt}}{1.0367 \text{g}} = 0.95 \text{ l air}$

Consume > 20% O<sub>2</sub> in 48 hrs?  
Air is ~ 21% O<sub>2</sub>

$0.21(0.95) = 0.19 \text{ l O}_2$  have

Consume  $\frac{1.71 \times 10^{-4} \text{ mole}}{\text{hr}} \times 48 \text{ hrs} = 0.0082 \text{ mole O}_2$  needed 48 hrs.

$PV = nRT$   
 $(1) V = (0.0082)(0.08206)(297)$

$V_{\text{O}_2} = 0.2 \text{ l}$

Consume 100% of O<sub>2</sub>

Dec 7-8:22 AM

Collecting a Gas

collecting a gas "over" water

under

replace the water with 'air'

Juliana's Air  
 Water + vapor = P<sub>T</sub>

Dec 7-8:42 AM

$$P_T = P_{\text{H}_2\text{O vapor}} + P_{\text{Johannes Air}}$$

22.5/22.6 → 23°C

constant at each Temp

Vapor Pressure  $P_{\text{H}_2\text{O}} = 21.07 \text{ Torr}$   
 → 0.028 atm

P III app B

dry air

Dec 7-8:54 AM

$$2 \text{KClO}_3 \rightarrow 2 \text{KCl} + 3 \text{O}_2$$

0.0067 mole? 0.81g → 0.01 mole

$$VP_{\text{H}_2\text{O}} \text{ at } 26^\circ \text{C} = 25.2 \text{ Torr}$$

$$VP_{\text{H}_2\text{O}} = 0.033 \text{ atm}$$

$$P_T = P_{\text{O}_2} + P_{\text{H}_2\text{O}}$$

$$765 = P_{\text{O}_2} + 25.21$$

$$739.79 \text{ Torr} = P_{\text{O}_2}$$

$$P_{\text{O}_2} = 0.973 \text{ atm dry O}_2$$

collected "over water"

$$V = 0.25 \text{ L O}_2$$

$$T = 26^\circ \text{C} = 299 \text{ K}$$

$$P = 765 \text{ Torr} = 1.007 \text{ atm}$$

moles O<sub>2</sub> collected?

$$n = \frac{PV}{RT}$$

$$n_{\text{O}_2} = \frac{(0.973)(0.25)}{(0.08206)(299)}$$

$$n_{\text{O}_2} = 0.01 \text{ mole O}_2$$

Dec 7-9:05 AM

KMT Kinetic Molecular Theory

- ① FAT guys are slow
  - ② gas go in straight lines until they collide → hit → bounce
- FAST → light (least mass)

Dec 7-9:14 AM

$$10 / 54 + 58$$

Dec 7-9:16 AM