

1. Write the correct answer in the space left.

(15 pts.)

- 1.7 x ↑ The volume of a gas decreases from 86ml to 51ml. By what factor will the pressure change?
- 1.3 x ↑ The T of a gas increases from -25°C to 50°C. By what factor will the volume change by?
- 2.5 ml He Which gas exerts the greatest pressure in a 20.0ml cartridge at 5°C? 10g He / 10g O₂ / 10g N₂
- Molar Mass, D What property of gases determines the rate at which a gas diffuses? 2.5 0.3 0.36
- CO₂ least mass Which gas has the greatest velocity at 25°C? SO₂ / CO₂ / Rn
- 273 °C At what Celsius temperature does an ideal gas have a volume of 0.0 liters?
- 3 atm N_{2(g)} + 3H_{2(g)} → 2NH_{3(g)}, Total pressure of reactants is 6 atm, what is P_{NH₃}?
- 0.00128 torr Air contains 0.000168% of CH₄ gas. What is P_{CH₄} at standard pressure in units of torr? 760 torr * 0.000168 =
- N₂O₅ Which gas has the greatest density at STP? N₂O₅ / N₂ / N₂O₄ 54.2 22.4 L
- F₂ Which gas has a density of 2.41 g/L at STP? Ne / CO₂ / F₂O 22.4 L
- 4x Gas A diffuses 2x faster than gas B. How many times heavier is gas B than A?
- decrease As moles ↑ pressure must (increase/ decrease) in order to keep same temperature and volume.
- 0.2 atm 0.2 atm of PH₃ gas is held in a 10.0L tank. What is P_{PH₃} in same tank if 3 atm of O₂ is added?

$$1.89/L \quad 0.6543/L$$

Reaction for questions (n) and (o) $2C_2H_6(g) + 7O_2(g) \rightarrow 4CO_2(g) + 6H_2O(g)$

- 250 mL At same T and P, what volume of C₂H₆ is needed to form 500.0 ml of CO₂?
- 396 torr If total pressure of reactants is 356 torr, what is total pressure of products?

$$D = \frac{P \cdot M}{R \cdot T}$$

- Using your understanding of Gas Laws explain how a person breathes (inhales and exhales). Start w/ muscle (3 pts.)
- Calculate and compare the densities (at 25°C and 1 atm) and relative rate of diffusion of N₂O with CH₄. Answer should be a statement which compares which gas is faster and by what factor. CH₄ is 1.7x faster (4 pts.)
- A student records the following data shown below. Use this data to find the molecular mass of the vapor. (4 pts.)

Mass of flask	194.033g
Mass of flask and condensate:	194.428g
Temperature of vapor:	99.5°C
Volume of flask:	167 ml
Air pressure	29.99 in Hg

$$M = \frac{0.395g \cdot R \cdot 372.5K}{1.002at \cdot 0.167L} = 72.2g/mol$$

- A mixture contains 100.0g of Cl₂O gas and 100.0 g of N₂O gas. Calculate the volume of this mixture at 25.0°C and 1250 torr. (6 pts.)

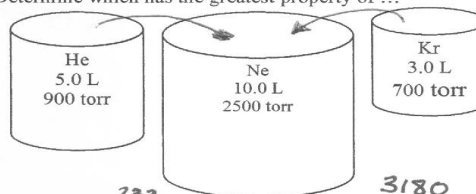
- 50.8 L What is the total volume of the mixture? 3.419 mol
420. torr What is the partial pressure in atmospheres of Cl₂O gas? 1.149 1250 torr =
830. torr What is the partial pressure in atmospheres of N₂O gas? 3.419

- What volume of ammonia gas is produced at 65.0°C and 2110 torr when 5.22g of ammonium chloride reacts with 3.73g of calcium hydroxide? $2NH_4Cl(aq) + Ca(OH)_2(aq) \rightarrow CaCl_2(aq) + 2NH_3(g) + 2H_2O(l)$ (5 pts.)

- Compare the 3 tanks of gases at same temperature. Determine which has the greatest property of ... (8 pts.)

- Ne moles
- SAME kinetic energy
- Kr density
- He rate of diffusion

- If all 3 gases are combined and mixed into the Ne tank calculate the partial pressure of each gas and the total pressure.



$$P_{He}: 450 \text{ torr} \quad P_{Ne}: 2500 \text{ torr} \quad P_{Kr}: 233 \text{ torr} \quad P_{Total}: 3180 \text{ torr}$$

- Gas A is found to have a density of 4.61 g/L at 20°C and 422 torr. Gas B diffuses 2.61 times faster than gas A at these same conditions. What is the molecular mass and density of gas B at these conditions? (5 pts.)

- 40.00 ml of a solution of nitric acid, HNO₃, is analyzed with an excess of CaCO₃ by the reaction: (5 pts.)

$2H^+(aq) + CaCO_3 \rightarrow Ca^{2+}(aq) + CO_2(g) + H_2O(l)$
If 36.21 ml of CO₂ gas is produced at 44.0°C and 30.55 in Hg, what is the concentration of the original nitric acid in units of g HNO₃/ml of solution? 0.00448 g/mL