

1A Exam 3
(end of Ch 4 redox, dilutions;
Chapter 10 gas laws)

NAME:

Read Carefully. All work & calculations must be shown. All UNITS must be shown! Relax & Good luck!

1. 1.5L of an 8.5M solution is diluted by adding 350mL of water. Calculate the new concentration of the solution.
2. Methane gas, CH_4 , combusts into water and carbon dioxide gases.
 - a. Write a balanced reaction. You should know who your reactants are!
 - b. Assign oxidation numbers to EACH ATOM.
 - c. Which atom is the reducing agent? Why?
 - d. Which atom is reduced? Why?

3. 3.0 grams of dry ice (solid CO_2) sublimates into a balloon at 25.0°C and 750mmHg . Calculate the volume in mL of CO_2 that occupies the balloon.

4. A gas at 60.0°C and 12L is cooled to 40.0°C . What is the new volume?

5. Calculate the molar mass of a gas if 2.50 g occupies 0.865 L at 690torr and 36°C .

6. 4.0L of a gas is collected over water 18°C and a pressure of 755mmHg . How many moles of gas is this? ($P_{\text{water}} @ 18^\circ\text{C} = 15.5\text{ torr}$)

7. A cylinder with a movable piston contains 1.75 moles of helium. How many moles of helium were added to the cylinder if the volume was changed from 2.00 L to 2.70 L?

8. Calculate the density in g/L of nitrogen monoxide using the molar volume of a gas at STP (22.4 liters/mole).

9. Calculate the amount in moles of methane gas (CH_4) that must be combusted in order to produce 500L of water vapor at 125°C and 760mmHg.

10. Calculate the velocity of nitrogen gas that is present in the atmosphere on a warm day (35°C).

1A Exam 3
Equation Sheet

CH 10

$$P_1 V_1 = P_2 V_2$$

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

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

$$PV = nRT \quad R = 0.08206 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$

$$V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$$

$$R = 8.314 \frac{\text{J}}{\text{mol} \cdot \text{K}}$$

CH 4

$$M_1 V_1 = M_2 V_2$$