

AR Chemistry: Semester 2, 2nd Final Exam, Mini Practice Test Name _____

Fill in the Blanks (These will be multiple choice on the final – saves space here)

1. What is the term for all the elements to the left and below the staircase? 1 _____
2. What element looks like a semimetal but is actually a metal? 2 _____
3. What is the special name for the main group 7 elements? 3 _____
4. What types of bonds are created between nonmetals and nonmetals? 4 _____
5. You find a liquid at room temperature. What type of bonding **must** it have? 5 _____
6. Which is larger, a metal atom or the metal ion? 6 _____
7. What is the formula created between: Fe^{+3} OH^{-1} 7 _____
8. What element comes in 2's and is a solid at room temperature? 8 _____
9. What term measures the amount of energy needed to knock electrons from an atom? 9 _____
10. What is the periodic trend for **decreasing** electronegativity? 10 _____
11. What subatomic particle determines the atomic number of an element? 11 _____
12. What subatomic particle is not used to determine the mass of an element? 12 _____
13. Two atoms of the same element but with different masses are called ?? 13 _____
14. How many protons, neutrons, and electrons are found in: ${}_{12}^{25}\text{Mg}^{+2}$ 14 _____
15. What is the term for the attraction between molecules? 15 _____
16. If solids are considered to be 3 units apart, how far apart are gas molecules? 16 _____
17. A liquid that has a high IMA then it has a (high, medium, low) vapor pressure 17 _____
18. If a liquid has a high vapor pressure, then it has a (high, medium, low) boiling point. 18 _____
19. How many electrons are available for bonding in CO_2 ? 19 _____
20. What element is happy with only 2 electrons in a Lewis Structure? 20 _____
21. One mole is defined as ??? atoms or molecules 21 _____
22. You have 67.2 Liters of gas at STP. How many moles of gas are present? 22 _____
23. We use 'grams' to measure (time, volume, mass, prison terms) 23 _____
24. What is the value for Standard Temperature in STP? 24 _____
25. What is the density of a material that has a mass of 78.0 grams and volume of 14 mL? 25 _____

Problems:

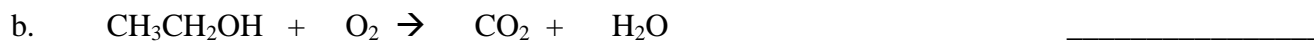
1. You place sand into a graduated cylinder. The volume of water increases from 25.0 mL to 40 mL. The mass on the scale changes from 110. g to 151 g. What was the density of the sand?

2. Draw the Lewis structure for:

a. O₂

b. SO₃

3. Balance the following equations. Place your answers on the lines on the right



4. You are given 4.00 moles of gas at 25 C and a pressure of 0.900 atm. What is the volume of the gas?

P =

V =

n =

R = 0.0821

T =

5. For the equation: $2 \text{H}_2(\text{g}) + 1 \text{O}_2(\text{g}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) \quad \Delta H = -136 \text{ kcal}$

a. How many grams of hydrogen are needed to burn 45.0 grams of oxygen?

b. How many kcal will be released when 36.9 grams of water form?

c. How many liters of oxygen at STP are needed to produce 25.0 grams of water?

d. How many liters of hydrogen gas at STP are needed to produce 200 kcal of energy?

6. Your birthday balloon is 4.0 L at 25 C and 790. mm Hg. What will be the volume when you drive to the mountains where the pressure is 730. mm Hg and the temperature is 10 C?

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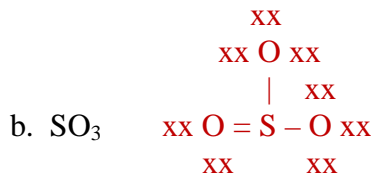
Fill in the Blanks (These will be multiple choice on the final – saves space here)

1. What is the term for all the elements to the left and below the staircase? 1 **Metals**
2. What element looks like a semimetal but is actually a metal? 2 **Aluminum**
3. What is the special name for the main group 7 elements? 3 **Halogens**
4. What types of bonds are created between nonmetals and nonmetals? 4 **Covalent**
5. You find a liquid at room temperature. What type of bonding **must** it have? 5 **Covalent**
6. Which is larger, a metal atom or the metal ion? 6 **Metal atom**
7. What is the formula created between: Fe^{+3} OH^{-1} 7 **$\text{Fe}(\text{OH})_3$**
8. What element comes in 2's and is a solid at room temperature? 8 **Iodine**
9. What term measures the amount of energy needed to knock electrons from an atom? 9 **Ionization Energy**
10. What is the periodic trend for **decreasing** electronegativity? 10 **To Left and Down**
11. What subatomic particle determines the atomic number of an element? 11 **Proton**
12. What subatomic particle is not used to determine the mass of an element? 12 **electron**
13. Two atoms of the same element but with different masses are called ?? 13 **Isotopes**
14. How many protons, neutrons, and electrons are found in: ${}_{12}^{25}\text{Mg}^{+2}$ 14 **12 P, 13 N, 10 e**
15. What is the term for the attraction between molecules? 15 **IMA**
16. If solids are considered to be 3 units apart, how far apart are gas molecules? 16 **3000**
17. A liquid that has a high IMA then it has a (high, medium, low) vapor pressure 17 **low**
18. If a liquid has a high vapor pressure, then it has a (high, medium, low) boiling point. 18 **low**
19. How many electrons are available for bonding in CO_2 ? 19 **16**
20. What element is happy with only 2 electrons in a Lewis Structure? 20 **Hydrogen**
21. One mole is defined as ??? atoms or molecules 21 **6.02×10^{23}**
22. You have 67.2 Liters of gas at STP. How many moles of gas are present? 22 **3**
23. We use 'grams' to measure (time, volume, mass, prison terms) 23 **Mass**
24. What is the value for Standard Temperature in STP? 24 **0 C, 273 K**
25. What is the density of a material that has a mass of 78.0 grams and volume of 14 mL? 25 **5.57**

Problems:

1. You place sand into a graduated cylinder. The volume of water increases from 25.0 mL to 40 mL. The mass on the scale changes from 110. g to 151 g. What was the density of the sand?
Mass = 41 g, Volume = 15 mL $D = m / v = 41 \text{ g} / 15 \text{ mL} = 2.73 \text{ g/mL}$

2. Draw the Lewis structure for:



3. Balance the following equations. Place your answers on the lines on the right



4. You are given 4.00 moles of gas at 25 C and a pressure of 0.900 atm. What is the volume of the gas?

P = 0.900 atm

V = ???

P V = n R T

n = 4.00 mol (0.900 atm) (V) = (4.00 mol) (0.0821) (298 K)

R = 0.0821 V = 108.7 L (109)

T = 25 C = 298 K

5. For the equation: $2 \text{H}_2(\text{g}) + 1 \text{O}_2(\text{g}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) \quad \Delta H = -136 \text{ kcal}$

a. How many grams of hydrogen are needed to burn 45.0 grams of oxygen?

$$45.0 \text{ g O}_2 \times \frac{1 \text{ mole O}_2}{32.00 \text{ g O}_2} \times \frac{2 \text{ mole H}_2}{1 \text{ mole O}_2} \times \frac{2.02 \text{ g H}_2}{1 \text{ mole H}_2} = 5.68 \text{ g H}_2$$

b. How many kcal will be released when 36.9 grams of water form?

$$36.9 \text{ g H}_2\text{O} \times \frac{1 \text{ mole O}_2}{18.02 \text{ g H}_2\text{O}} \times \frac{-136 \text{ kcal}}{2 \text{ mole H}_2\text{O}} = -1390 \text{ kcal}$$

c. How many liters of oxygen at STP are needed to produce 25.0 grams of water?

$$25.0 \text{ g H}_2\text{O} \times \frac{1 \text{ mole H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{1 \text{ mole O}_2}{2 \text{ mol H}_2\text{O}} \times \frac{22.4 \text{ L O}_2 \text{ STP}}{1 \text{ mole O}_2} = 15.5 \text{ L O}_2 \text{ STP}$$

d. How many liters of hydrogen gas at STP are needed to produce 200 kcal of energy?

$$-200 \text{ kcal} \times \frac{2 \text{ mole H}_2}{-136 \text{ kcal}} \times \frac{22.4 \text{ L H}_2 \text{ STP}}{1 \text{ mole H}_2} = 65.9 \text{ L H}_2 \text{ STP}$$

6. Your birthday balloon is 4.0 L at 25 C and 790. mm Hg. What will be the volume when you drive to the mountains where the pressure is 730. mm Hg and the temperature is 10 C?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \quad \frac{(790 \text{ mm})(4.00 \text{ L})}{298 \text{ K}} = \frac{(730. \text{ mm}) V}{283 \text{ K}} \quad V = 4.11 \text{ L}$$