**Final Exam, 2024**

**Mr. Guch’s General Chemistry**

**Before starting this exam, please fill out the following information:**

**1) Your full name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**2) Today’s date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Honor code: I swear, on my honor and in my faith in God, to take this exam without any information, devices, or assistance used either by myself or with others. Furthermore, I will not tolerate violations of this honor code among my peers, and swear to report any other student who does violate this honor code.**

**Please sign your name to indicate that you will live by this pledge: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Handy information for the exam:**

* **Every sheet of paper you require for this exam is included in this packet. You may remove the last two pages from this packet while taking the exam (they are a periodic table and sheet of scratch paper) but you must also staple them on the back of your completed test before turning it back in.**
* **You may not use your iPad until every student has completed the exam. No exceptions. You may, however, study for other exams using paper copies of your preparation materials.**
* **You may use the bathroom once during this exam and may only be gone for a total of three minutes. It is encouraged that you use the bathroom before the exam starts.**
* **Please show your work. If you show your work I can give partial credit for answers which are incorrect but show a basic understanding of the material.**

**Final Exam, Mr. Guch’s General Chemistry – 2024**

Instructions: Pretty much just answer the questions. Make sure you show all work so I can give you partial credit if you get the wrong answer. Remember that you have one hour and forty minutes to take the exam, so pace your work accordingly.

Other things:

* If you need to use the bathroom, do it now. Bathroom trips are discouraged during this exam and may take no more than three minutes.
* You may not have anything on your desk except for a writing tool and a calculator. Everything else will be provided for you.
* You may not use your iPad until everybody has turned in their exam. If you would like to study for your other exams, have paper copies of the study materials available.
* Show your work. Seriously. It’s good for partial credit!

**Matching section:**

Match the following terms with the proper definition. To answer questions, write the letter of the correct definition to the left of each vocabulary word.

1)\_\_\_\_\_\_\_ pressure A) The postulates that describe the characteristics of a gas

2)\_\_\_\_\_\_\_ covalent bond B) Equal to 0.08206 Latm/mol K. Also known as “R”

3)\_\_\_\_\_\_\_ polarity C) 6.02 x 1023 things

4)\_\_\_\_\_\_\_ limiting reagent D) The thing you run out of first in a chemical reaction

5)\_\_\_\_\_\_\_ percent yield E) The idea that electrons want to spread as far apart as

possible in a covalent compound

6)\_\_\_\_\_\_\_ kinetic molecular theory

F) The partial separation of charge in a bond or molecule

7)\_\_\_\_\_\_\_ theoretical yield

G) The amount of force that gas molecules exert on the

8)\_\_\_\_\_\_\_ ideal gas constant sides of a container that holds them

9)\_\_\_\_\_\_\_ mole H) The amount of product that stoichiometry predicts

should be made in a chemical reaction

10)\_\_\_\_\_\_\_ VSEPR

I) Two electrons shared between two atoms

J) A way of measuring how well a chemical reaction was

formed using the amount of product that was made

11) Draw the Lewis structure of PF3 and indicate all of the following:

* The drawing, of course: (4 pt)
* The shape of the molecule: (1 pt)
* The bond angles around the central atom: (1 pt)
* A drawing of the dipole arrow if the molecule is polar (show none if it is nonpolar): (1 pt)

Shape: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bond angles: \_\_\_\_\_\_\_\_\_\_\_

12) Explain what polarity is and how it is related to the structure of a covalent compound: (5 pt)

13) How many moles are in 56 grams of BH3? (4 pt)

14) Why is it reasonable to make the assumption that gas molecules experience no intermolecular forces? Explain your answer. (5 pt)

15) If I have 28 grams of CH4 in a container with a volume of 50 L and a pressure of 2.5 atm, what is the temperature within the container? R = 0.08206 Latm/molK. (5 pt)

16) If I decrease the volume of the container in problem 5 to 30 L, what will the pressure be inside of this container? (5 pt)

17) What are the four postulates of the kinetic molecular theory of gases? (8 pt)

18) Write the complete equation for the following reaction: (5 pt)

*When aluminum metal is added to a solution of tin(IV) fluoride (formula = SnF4) and heated, tin metal and a solution of aluminum fluoride (formula = AlF3) are formed. This reaction makes the beaker in which it is performed become warm.*

19) What is the difference in bonding between ionic and covalent compounds? What affect, if any, does this have on the structures of these compounds? Explain your answers. (9 pt)

20) Consider the following reaction: \_\_\_\_\_ AgOH + \_\_\_\_\_ Mg → \_\_\_\_\_ Ag + \_\_\_\_\_ Mg(OH)2

a) Balance it (1 pt)

b) What type of reaction is this? (1 pt) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Using the solubility table and/or activity series on the back of the periodic table, will this reaction actually take place? (1 pt, circle answer):

YES NO

d) If I combine 35 grams of silver hydroxide with 10 grams of magnesium, how many grams of magnesium hydroxide can be formed? (7 pt)

e) What is the limiting reagent? (1 pt) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f) How much of the excess reagent will remain when the reaction is complete? (4 pt)

g) If I perform this reaction and actually make 25 grams of magnesium hydroxide, what is my percent yield for this reaction? (3 pt)

h) Is your answer to part g reasonable? Explain. (2 pt)

This sheet is intentionally blank. Question 20 was the last question on this exam. Please use any remaining time to review your answers.

This sheet is scratch paper for use on this exam. It must be re-stapled to the back of your completed exam when you are finished.

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