

Name _____ Date _____ Hour _____

Core Chemistry Semester I Review

Directions: Answer the following questions or fill in the following tables. For any mathematical computations, show work for credit. Answer all mathematical questions to 3 significant figures unless specifically instructed otherwise.

Lab Safety

Vocab Word	Brief Definition	Question
Beaker		Draw a picture.
Graduated cylinder		Draw a picture.
Test tube		Draw a picture.
Test tube holder		Draw a picture.
Beaker tongs		Draw a picture.
Crucible tongs		Draw a picture.
Bunsen burner		Draw a picture.
Sparker/ Starter		Draw a picture.
Erlenmeyer flask		Draw a picture.
Evaporating dish		Draw a picture.

Matter and Change

Vocab Word	Brief Definition	Question
Mass		What is the difference between mass and volume?
Matter		Is heat matter?
Law of Conservation of Matter		When must we follow this law?
Chemistry		Why is chemistry the central science?
Accuracy		What is the difference between accuracy and precision?
Quantitative measurement		What is the difference between a qualitative and quantitative measurement? Give examples.
Physical change		What is the difference between chemical and physical changes? What are the 5 signs of chemical change?
Physical property		What is the difference between chemical and physical properties?

1. Make the following conversions:

1.23 g to kg	
252 mm to m	
0.00784 L to mL	
34.5 cg to g	
6.03 km to m	

2. How many significant figures are in the following measurements?

0.00385 cm	
17.30 cm ³	
0.00370 mg	
2500 mi	
404 L	

3. Classify each measurement as qualitative or quantitative.

a hot shower	
a dozen eggs	
nine innings	
a tall building	

4. Put the numbers into or take out of scientific notation.

1500	
.00000982	
	1.003×10^3
	6.63×10^{-4}

5. Joey determined the density of a piece of gold to be 21.2 g/cm^3 . When he looked up the density on the Internet, he found it was 19.3 g/cm^3 . What is his percent error?

6. Fill in the following table.

$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{K}$
56.2		
	13.2	
		394

7. List the following changes as physical or chemical.

water boils	
grape juice is converted to wine	
dew is dried by the sun	
a dark cloth is faded by sunlight	

8. If 44 grams of carbon dioxide react completely with 18 grams of water, what mass of carbonic acid will be formed?

Atomic Structure

9.

Vocab Word	Brief Definition	Question
Atomic #		Where can you find the atomic number for any element?
Mass #		How do you find the number of neutrons if you know the mass number?
Isotopes		What do isotopes have in common? What is different?
Atom		What is the difference between an element and an atom?
Ion		What does the charge show you about an ion?

10. Complete the table.

Element	# of p ⁺	# of e ⁻	# of n ^o	Atomic #	Mass #
Mn			30		
	11	10	12		
				89	227

11. There are two isotopes of element X. X-12 and X-13. Their relative abundances are 98.9% and 1.10% respectively. Calculate the atomic mass of element X to 3 decimal places. What is the most likely identity of element X?

12. List 3 properties of metals, non-metals and metalloids.

Metals	Non-metals	Metalloids

13. On the following periodic table, label the following terms: period, representative elements, transition elements, inner transition elements, metals, nonmetals, metalloids, alkali metals, alkaline earth metals, halogens, noble gases, lanthanide series, actinide series

[illegible]

14. Write a nuclear equation for each of the following radioactive decays.

Alpha decay of francium-208	
Electron capture by beryllium-7	
Beta emission by argon-37	

15. Polonium has a relatively short half-life of 164 seconds. How many seconds would it take for 8.0 g of this isotope to decay to 0.25 g?

16. How many half-lives will it take for 16 g of Pd-103 to decay to 1.0 g? The half-life of Pd-103 is 17 days.

17.

Vocab Word	Brief Definition	Question
Monatomic ion		How do you know the charges of the monatomic ions?
Polyatomic ion		List the 13 polyatomic ions you need to know.
Binary ionic compound		What two types of elements make up a BIC?
Ternary ionic compound		What must be in a ternary ionic compound?
Binary molecular compound		What two types of elements make up a binary molecular compound?
Acid		Give three examples of acids.

20. Fill in the table.

Ion	Cation or Anion?	# of electrons lost/gained	Name of ion
Ca^{2+}			
N^{3-}			
OH^-		N/A	
SO_4^{2-}		N/A	
NH_4^+		N/A	

21. Name or write formulas for the following binary ionic compounds.

Name	Formula
	CaO
	FeBr ₂
Sodium sulfide	
Iron (II) oxide	

22. Name or write formulas for the following ternary ionic compounds.

Name	Formula
	Mg(NO ₃) ₂
	K ₂ CrO ₄
Ammonium chloride	
Calcium hydroxide	

23. Name or write formulas for the following binary molecular compounds.

Name	Formula
	C ₄ H ₁₀
	P ₂ O ₅
Sulfur hexafluoride	
Dinitrogen tetrasulfide	

24. Give 4 properties of ionic and molecular compounds.

Ionic Compounds	Molecular Compounds

25. Find the molar mass of each compound to the first decimal place.

Compound	Molar Mass
C ₆ H ₁₂ O ₆	
NaHCO ₃	
Mg(NO ₃) ₂	

26. Perform the following calculations using the mole map. Show all work for credit, and round answers to 3 significant figures.

Calculate the mass of 0.894 moles of C ₆ H ₁₂ O ₆ .	How many atoms are 0.230 moles of Mg?
Calculate the number of moles in 200 L of CO ₂ .	What is the mass of 4.44×10^{23} molecules of HCl?

27. Perform the following calculations about percent composition.

My favorite desert is made with 450 g of graham crackers, 50 g of butter, 200 g of cream cheese, and 83 g of lemon juice. What is the percent composition of this cheesecake?

Determine the percent composition of $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$?

Which compound has a higher percent of aluminum in it, AlCl_3 or $\text{Al}_2(\text{SO}_4)_3$?

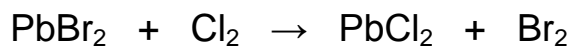
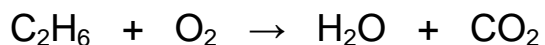
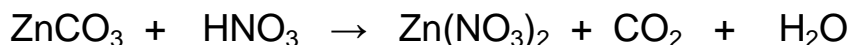
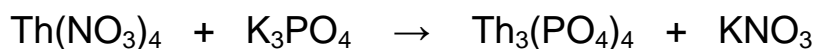
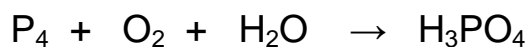
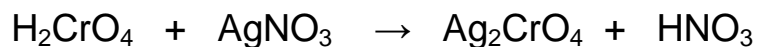
28. What is the empirical formula for the compound that contains 45.0%K, 18.0% S, and 37.0% O?

29. What is the molecular formula for a compound with empirical formula NaCO_2 and molar mass 134.0g?

30. In a chemical equation, how do you show the following?

Heat is added to a reaction	
A reactant is aqueous	
A reactant is solid	
A reactant is liquid	
A reactant is gas	
Sunlight is added to a reaction	
Electricity is added to a reaction	
H ₂ SO ₄ is used as a catalyst	

31. Balance the following reactions.



32. Describe the five reaction types,

Combination	
Decomposition	
Single Replacement	
Double Replacement	
Combustion	

33. Tell which type of reaction is taking place in all of the reactions in question 31. Skip the fourth equation for this question only.