

**HONORS CHEMISTRY PRACTICE FINAL (semester one):**

1. What are the three subatomic particles, their charges, and their mass?
2. What is atomic number and where do you find it? What is mass number and where do you find it?
3. How many protons, electrons, and neutrons are in the following atoms/ions?  
Chlorine  
Nickel  
 $\text{Cs}^{+1}$   
 $\text{P}^{-3}$
4. Use the following notation to answer the questions:  $^{138}_{56}\text{Ba}$   
How many protons?  
How many neutrons?  
What is the mass number?  
What is the atomic number?
5. What is an isotope?
6. How does Carbon-12 and Carbon-14 differ?
7. What defines an element?
8. Write the orbital notation for the following:  
Vanadium  
Sulfur  
Neon
9. Write the electron configuration for the following:  
Phosphorous  
Bromine  
Neon  
 $\text{O}^{-2}$   
 $\text{Na}^{+1}$
10. Write the noble gas configuration for the following:  
Calcium  
Cesium  
Boron
11. What element with electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^1$ ?
12. What is ground state? What is excited state? Which one required absorption of energy as an electron moves to it? Which one releases energy as an electron moves to it? What is created as an electron moves from one energy level to an orbit closer to the nucleus?
13. Circle the pairs that are isoelectronic.  
Kr and  $\text{Br}^{-1}$   
 $\text{Br}^{-1}$  and  $\text{Rb}^{+1}$   
 $\text{Ca}^{+2}$  and Kr  
 $\text{Ca}^{+2}$  and Ar
14. What is the octet rule? What elements on the periodic table have a full octet? What are valence electrons? What happens to valence electrons as you move down a group on the periodic table?
15. What is the difference between a group and a period on the periodic table?
16. What is periodic law?

17. Where is the location of the following?  
Alkali metals  
Alkaline earth metals  
Transition Metals  
Metalloids  
Halogens  
Noble Gases  
Lanthanides  
Actinides
18. What is electron shielding? What is effective nuclear charge?
19. Define the following trends:  
Atomic Radius  
Ionic Radius  
Ionization Energy  
Electron Affinity  
Electronegativity  
Reactivity
20. As you move across a period, what happens to the following trends:  
atomic radii  
ionization energy  
electron affinity  
electronegativity  
reactivity  
effective nuclear charge  
electron shielding
21. As you move down a group, what happens to the following trends:  
atomic radii  
ionization energy  
electron affinity  
electronegativity  
reactivity  
effective nuclear charge  
electron shielding
22. Do halogens have high or low ionization energies? Do they have high or low electron affinities?
23. Out of the following elements, which has the largest atomic radii? Which is the most reactive? Which shares properties with Cesium, Cs? Which as a valence electron configuration of  $s^2$ ? Which has the lowest electronegativity?  
Sodium, Na  
Potassium, K  
Magnesium, Mg  
Calcium, Ca
24. List the first 3 ionization energies for Be (Look in your book). Where do you notice a large increase in ionization energy? Why? Draw a graph illustrating this large jump.
25. Which element lies in the same period as the element with the electron configuration of  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$ ?

26. Which electrons are used to form chemical bonds? What is the difference between ionic and covalent bonds? What does electronegativity have to do with the types of bonds formed?

27. What is the electronegativity difference for the following elements and what type of bonds would they form?

Ca and S  
Al and Cl  
~~+~~ Mg and N

Br and Cl

H and Cl

O and O

28. Name the following compounds:

PF<sub>5</sub>

ICl<sub>3</sub>

P<sub>4</sub>O<sub>10</sub>

Ag<sub>2</sub>O

Ca(OH)<sub>2</sub>

~~KClO<sub>3</sub>~~

SnI<sub>4</sub>

29. Write the formula for the following:

Potassium Nitride

Aluminum Bromide

Sodium Fluoride

Vanadium (III) Bromide

Iron (III) Sulfide

Copper (II) Sulfate

Calcium Carbonate

Potassium Sulfate

Dinitrogen Pentoxide

Sulfur Hexafluoride

Disulfur Dichloride

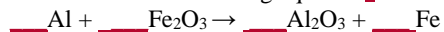
30. Which is stronger? Intermolecular Forces or Intramolecular Forces?

31. List the following types of bonds from weakest to strongest: Ionic, Nonpolar Covalent, Polar Covalent

32. What has more atoms, 50g of Al or 50g of Au?

33. What diatomic molecule has a mass of 25.09g in a 0.157mol sample?

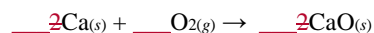
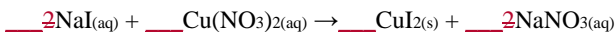
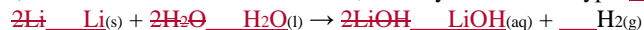
34. Balance the following equations:



2) —

4) 36. A chemical reaction involving substances A and B stops when A is B is the (excess/limiting) reactant?

5) 37. For the reactions below, identify the reaction types and balance the reactions:



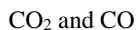
Use the following activity series for question 438.

METALS Activity Series
Lithium
Potassium
Magnesium
Iron
Lead

6) 38. What metals would replace Mg in a chemical reaction?

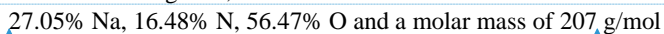
39. What is the percent of oxygen in CaSO<sub>4</sub>?

40. Which pair of compounds has the same empirical and molecular formula?



7) 41. What is the empirical formula for a compound that is 56.4% phosphorus and 43.6% oxygen?

42. Given the following data, find the molecular formula:



43. Given the formula Ca(NO<sub>3</sub>)<sub>2</sub>, which of the following is incorrect?

The mole ratio is 1 mol of Ca to 2 mol of N to 6 mol of O

The ratio is 1 atom of Ca to 2 atoms of N to 6 atoms of O

The ratio is 1g of Ca to 2g of N to 6g of O

The ratio of cations to anions is 1 to 2.

44. For the reaction PbCl<sub>2</sub> + K<sub>2</sub>SO<sub>4</sub> → 2KCl + PbSO<sub>4</sub>, if you have 12 moles of KCl, how many moles of PbCl<sub>2</sub> did you start with?

8) 45. For the reaction 2Na + 2H<sub>2</sub>O → 2NaOH + H<sub>2</sub>, if 52.g of sodium and 120.g of water are available, which is the limiting reactant? Excess reactant? How many grams of hydrogen is produced?

46. For the reaction SO<sub>3</sub> + H<sub>2</sub>O → H<sub>2</sub>SO<sub>4</sub>, how many grams of sulfur trioxide are required to produce 4.00 mol of sulfuric acid?

Formatted: Line spacing: Multiple 1.08 li, No bullets or numbering

Formatted: Font: 12 pt

Formatted: Space After: 0 pt, Line spacing: Multiple 1.08 li, No bullets or numbering

Formatted: Font: 12 pt

Formatted: Font: 12 pt

Formatted: Font: 12 pt

Formatted: Font: 11 pt

Formatted: List Paragraph, Line spacing: Multiple 1.08 li, No bullets or numbering

9) 47. What mass in grams of 1-chloropropane ( $C_3H_7Cl$ ) is produced if 200. g of react with excess chlorine gas according to the equation  $C_3H_8 + Cl_2 \rightarrow C_3H_7Cl + HCl$ ?

+0) 48. How many moles of Ag can be produced when reacting with 100. g of Cu to the equation  $Cu(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Cu(NO_3)_2(aq)$ ?

+1) 49. For the reaction  $Mg + 2HCl \rightarrow H_2 + MgCl_2$ , calculate the percent yield of magnesium chloride if 50. g of magnesium react with excess hydrochloric acid to yield 60. g of magnesium chloride.

50. When mixing baking soda and 6 M hydrochloric acid, the following reaction occurred,  $NaHCO_3 + HCl \rightarrow NaCl + CO_2 + H_2O$

Given the following sample data, what is the **PERCENTAGE YIELD** of NaCl for this reaction?

Baking Soda = 1.65 grams

Dish = 40 grams

Cover = 10 grams

Final weight of dish, cover, & NaCl = 51.0g

+2) 51. Given the following table, what is the volume of the acid necessary to titration?

	Acid	Base
Formula	HCl	$Ca(OH)_2$
Volume	?	22.7 mL
Molarity	0.0375	0.0200

52. Identify the type of reaction, predict the products and balance the reaction:

