

Chemistry: Final Exam Review Trimester A

Be sure to carefully look over all of the lab work your teacher has returned to you. Also be sure to review all power points and other notes that you have taken. Review the homework you have completed throughout the course.

1. What is meant when we describe a measurement as accurate?

It is the correct measurement.

It is the same as or very close to the standard or accepted measurement.

What is meant when we describe a measurement as precise?

When we repeat the measurement, we get the same or very close to the same results.

The more sig. figs., the more precise the measurement.

2. The volume of a standard (all other measured values are compared to the standard, it is considered accurate) metal cylinder is 3 mL. This would be an exact number and would have infinite sig figs. A student measures the volume of this cylinder 3 times and finds the volume to be 3.000mL, 3.001mL, and 2.999mL. How would you describe this data?

Both accurate and precise. $\pm 0.001\text{mL}$

3. Review the rules for use of significant figures in your text in chapter 1.

Do the following calculations involving measurements and be sure to round to the correct number of sig figs. Be sure to label with correct units.

a. $\frac{243.6\text{ g}}{18.5\text{ mL}} = 13.2\text{ g/mL}$

b. $\frac{(4.55 \times 10^{18}\text{ g})(3.6 \times 10^9\text{ g})}{3.778 \times 10^{12}\text{ g}} = 4.3 \times 10^{15}\text{ g}$

c. $14.5\text{ cm} + 12.88\text{ cm} + 9.123\text{ cm} + 5.15\text{ cm} = 41.7\text{ cm}$

d. $5.55\text{ cm}(\overset{14.1\text{ cm}}{1.5\text{ cm} + 12.6\text{ cm}}) = 78.3\text{ cm}^2$

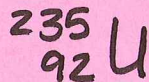
4. List the subatomic particles that make up an atom, their location in the atom, their relative mass and relative charge.

<u>Particle</u>	<u>Relative Mass</u>	<u>Relative Charge</u>
(p ⁺) proton - in nucleus	1	+1
(n ⁰) neutron - in nucleus	1	0
(e ⁻) electron - outside nucleus	$\frac{1}{1840}$	-1

5. What is an isotope?

An atom of a particular element that has the same # of p⁺ as other atoms of that element but different # of neutrons so it will have a different mass #.

6. a. Write the symbol for an isotope of uranium with 143 neutrons.



b. What is the mass number for this isotope?

235

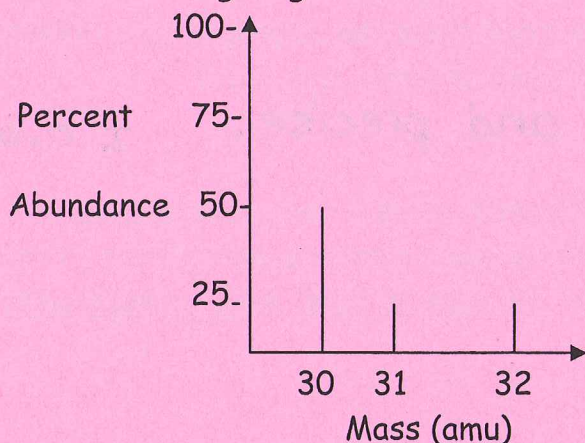
c. What is the atomic number for this isotope?

92

7. The relative atomic mass (weight) for phosphorus is 30.974amu. Which isotope of P is most likely the most abundant isotope?

P-31

8. The following diagram should be used to answer the question below.

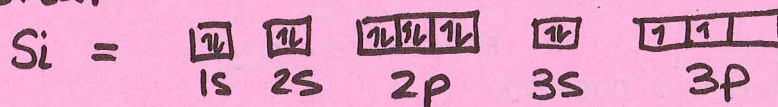


Calculate the relative atomic mass for the element that has the above mass spectrum.

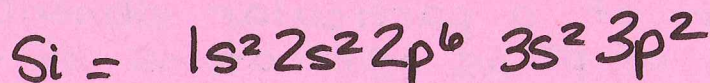
$$(30 \times 0.50) + (31 \times 0.25) + (32 \times 0.25) = 30.75$$
$$15 + 7.8 + 8.0 = 31u$$

9. Write the orbital diagram and electron configuration for an atom of silicon.

Orbital:



e⁻ configuration :



10. List examples of the following on the periodic table:

a. metal **LEFT OF BLUE STAIRCASE EXCEPT H.**

b. nonmetal **RIGHT OF BLUE STAIRCASE PLUS H.**

c. metalloid **Si, Ge, As, Sb, Te**

d. diatomic element **H₂, N₂, O₂, F₂, Cl₂, Br₂, I₂**

e. family **A COLUMN; \updownarrow SODIUM FAMILY OR ALKALI METALS
NOBEE GASES, HALOGENS**

f. period **A ROW; \leftrightarrow**

g. transition metal **"D BLOCK"**

h. inner transition metal **"F BLOCK"**

11. If you compare x-rays to radio waves, which would have the highest frequency? the longest wave length?

**P.269 X-RAYS HAVE HIGHEST FREQUENCY
RADIOWAVES HAVE LONGEST WAVELENGTH**

12. Examine the line spectrum for the element hydrogen. Do the lines in the spectrum converge at the high energy end of the spectrum or the low energy end? Why do the lines converge?

THE LINES CONVERGE AT THE HIGH ENERGY END OF THE SPECTRUM BECAUSE THE DISTANCES BETWEEN THE ENERGY LEVELS THE ELECTRONS EXIST IN ARE CLOSER TOGETHER AND THE ELECTRONS DIFFERENCE IN ENERGY IS LESS BETWEEN THE HIGHER ENERGY LEVELS WHEN COMPARED WITH

13. Which has the greater atomic radius, lithium or rubidium? Explain.
Rb: THE VALENCE ELECTRONS IN Rb ARE FOUND IN THE 5th ENERGY LEVEL. Li HAS VALENCE ELECTRONS IN THE 2nd ENERGY LEVEL.

THE DIFFERENCE IN ENERGY IN A 1S e⁻ AND A 2S e⁻.

14. Which has the greater atomic radius, sodium or chlorine? Explain.

Na: THE VALENCE ELECTRONS FOR BOTH ARE IN THE 3rd ENERGY LEVEL BUT THE EFFECTIVE NUCLEAR PULL IS GREATER

15. Place in order of smallest ionic radius to largest: K⁺, Ar, Cl⁻. **IN Cl.**



16. Which element has the lowest electronegativity on the periodic table? the highest? Explain.

LOWEST = Fr HIGHEST = F

Fr WILL LOSE AN e^- SO IT WILL NOT BE ATTRACTED TO THE e^- 'S IN A BOND. F WILL GAIN AN e^- TO HAVE A NOBLE GAS CONFIGURATION SO IT WILL BE STRONGLY ATTRACTED TO THE e^- 'S IN A BOND.

17. Write correct names for the following:

a. K_2O POTASSIUM OXIDE

b. N_2O DINITROGEN MONOXIDE

c. $Co_2(C_2O_4)_3$ COBALT (III) OXALATE

d. $(NH_4)_2SO_4$ AMMONIUM SULFATE

e. $FeHPO_4$ IRON (II) HYDROGEN PHOSPHATE

18. Write the correct formula for the following:

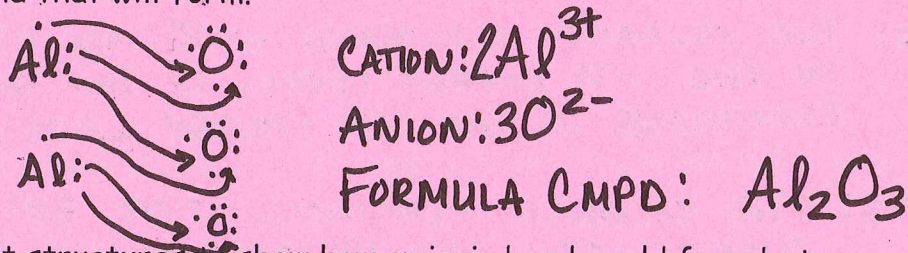
a. calcium dihydrogen phosphate $Ca(H_2PO_4)_2$

b. sulfur hexafluoride SF_6

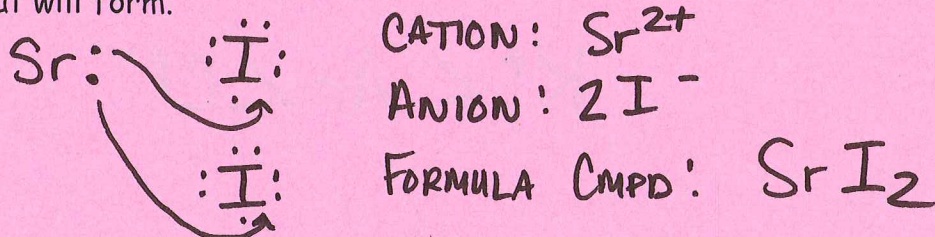
c. tungsten (IV) hydroxide $W(OH)_4$

d. copper (I) nitrite $CuNO_2$

19. Draw dot structures to show how an ionic bond would form between aluminum and oxygen. Write the formulas for the cation, anion and compound that will form.

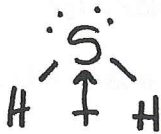


20. Draw dot structures to show how an ionic bond would form between strontium and iodine. Write the formulas for the cation, anion and compound that will form.



21. For the following, determine the structural formula, molecular geometry (shape), if the molecule is a polar or nonpolar covalent molecule and draw the dipole moment on the molecule if there is one.

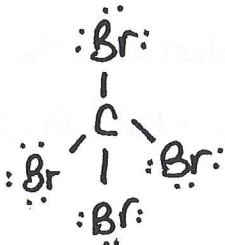
a. H_2S



ANGULAR

POLAR MOLECULE

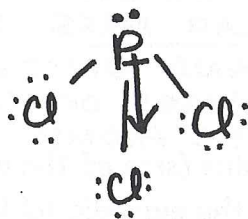
b. CBr_4



TETRAHEDRAL

NONPOLAR MOLECULE

c. PCl_3



TRIGONAL PYRAMIDAL

POLAR MOLECULE

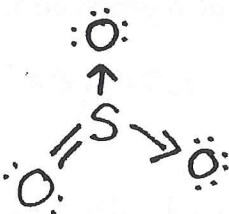
d. CO_2



LINEAR

NONPOLAR MOLECULE

e. SO_3



TRIGONAL PLANAR

NONPOLAR MOLECULE

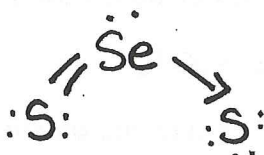
f. HCl



LINEAR

POLAR MOLECULE

g. SeS_2



ANGULAR

SLIGHTLY POLAR MOLECULE

* THE DIFFERENCE IN ELECTRONEGATIVITY BETWEEN Se & S is so small that THE DIPOLE ENDS UP VERY TINY.

22. In which of the following would hydrogen bonding be expected to occur?



H must be directly bonded to N, O or F.

23. a. How many moles are 135.82 g of Na₂CO₃?

MOLAR MASS Na₂CO₃ = 105.99 $\frac{\text{g}}{\text{mol}}$

$$\frac{135.82\text{g}}{105.99\text{g/mol}} = 1.2814\text{ mol Na}_2\text{CO}_3$$

b. How many formula units (particles) would this be?

$$1.2814\text{ mol} \times 6.022 \times 10^{23}\text{ f.u./mol} = 7.717 \times 10^{23}\text{ f.u.}$$

24. What is the difference between the molecular mass of H₂O and the molar mass of H₂O? MOLECULAR MASS IS THE RELATIVE MASS FOR ONE MOLECULE AND UNITS ARE "AMU" or "u"
MOLAR MASS IS THE MASS OF 6.022 x 10²³ particles AND IS EQUAL TO THE ATOMIC WEIGHT (RED # ON PT) IN grams.

25. What happens to the atomic radius (size of the atom) as you go from left to right across a period on the periodic table?

Gets smaller

As you go from top to bottom of a group on the periodic table?

Gets Larger

26. What is ionization energy?

Energy required to remove an e⁻ from an atom.

What is electron affinity?

Energy change that happens when atom takes in an e⁻.

What is lattice energy?

Energy released when cation and anion attract to form crystal (solid) lattice of ionic compound.

27. What happens to the ionization energy for an atom as you go from left to right across a period on the periodic table?

Increases

As you go from top to bottom of a group on the periodic table?

Decreases