**AP Chemistry Summer Practice Problems**

**I. The metric system and conversions**



**Use the conversion chart to make the following conversions:**

1. 1000 cm to meters: 2. 453 mL to L:

3. 7.21 nm to km: 4. 7123 meters to mm:

5. 697 L to mL: 6. 0.00056 nm to m:

7. 47 pm to nm: 8. 39.39 m to micrometers:

**II. Atomic Theory and Structure**

A. For each of the following elements, list:

 1. The name of the element

2. How many protons are contained within the nucleus?

3.How many neutrons are contained within the nucleus?

4. How many electrons are contained within a single neutral isotope of this element?

 a. F – 19 b. Al – 26 c. Cr – 53

 d. Ag – 111 e. N – 14 f. C – 14

 g. U – 253 h. S – 32 i. Ar – 40

B. What is an isotope?

C. Chromium has four naturally occurring isotopes that are found at the following abundances:

|  |  |
| --- | --- |
| **Isotope** | **Abundance** |
| Cr – 50 | 4.35% |
| Cr – 52 | 83.79% |
| Cr – 53 | 9.50% |
| Cr – 54 | 2.36% |

Find the average atomic mass of chromium.

**II. The Periodic Table**

1. Which element from each set is most electronegative? (Circle)

a. F or C

b. Al or Cl

c. Po or S

d. Cs or I

e. Ca or Cl

f. N or S

 2. Write the electron configuration for each of the following elements:

1. Oxygen: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Carbon: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Chlorine: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Krypton: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Zinc: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Palladium: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Potassium: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Lead: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Draw an orbital diagram for each of the following elements:

1. Nitrogen b. Fluorine

c. Copper d. Tin

**III**. **Stoichiometry**

1. Find the molar mass (g/mol) of the following elements and compounds:

 a. H2 b. O2 c. CO2

 d. C6H12O6 e. CH3OH f. HPO4

2. Solve the following stoichiometry problems:

a. Find the mass (in grams) of 0.785 moles of NaOH.

b. How many carbon atoms are contained in 84.3 g of ethyne (C2H2)?

**IV**. **Naming compounds (use the “stuff to memorize for the AP exam” chart for help)**

Write the name for each of the following compounds, and label each as ionic (I) or covalent (C):

1. SCl3 - 2. CO2 - 3. H2SO4 –

4. CH4 - 5. PF4 - 6. Na2O –

7. KSCN- 8. NaC2H3O2 - 9. PbNO2 –

10. NaClO (aka bleach) - 11. NH4ClO4 -