

Final Review - Chem A

1. List, define, and give an example of each step of the **scientific method**.

2. Convert the following:

$1.50 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

$25 \text{ kg} = \underline{\hspace{2cm}} \text{ mg}$

$75 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

3. How many **significant figures** in each?

- a) 1000
- b) 1.005
- c) 408.0
- d) 0.00100
- e) 1000.

4. Calculate (remember sigfig rules!):

- a) 237×5.8
- b) $278 / 6.15$
- c) $6.8 + 12.665$
- d) $7.55 - 6.55$

5. Convert **scientific notation** to **plain decimal** or vice versa:

- a) 10062
- b) 0.00005650
- c) 10705.00
- d) 4.623×10^{-5}
- e) 6.25×10^8
- f) 8.00×10^6

6. Write the formula for finding **density**. What is the density of a sample that has a mass of 98.6 g and a volume of 62.1 ml?

7. Convert the following **temperatures**:

- a. $473 \text{ K} = \underline{\hspace{1cm}} \text{ }^\circ\text{C} \quad \underline{\hspace{1cm}} \text{ }^\circ\text{F}$
- b. $-272 \text{ }^\circ\text{C} = \underline{\hspace{1cm}} \text{ K} \quad \underline{\hspace{1cm}} \text{ }^\circ\text{F}$
- c. $796 \text{ }^\circ\text{F} = \underline{\hspace{1cm}} \text{ }^\circ\text{C} \quad \underline{\hspace{1cm}} \text{ K}$

8. Are the following **physical** or **chemical** properties?

- a. Helium is inflammable.
- b. Water melts at 0°C .
- c. Water's density is 1.0 g/mL .
- d. Sodium reacts with water.

9. **Physical** or **chemical** change?

- a. ice melts
- b. glass breaks
- c. wood burns
- d. water boils

10. How is the **Periodic Table** arranged? Where are the *metals*, *semimetals* (metalloids), *nonmetals*, *transition metals*, *alkali metals*, *alkaline earth metals*, *halogens*, and *noble gases* located?

11. Describe Rutherford's experiment (gold foil) and explain its significance.
12. Be able to define and use the **terms** *atomic number, isotopes, diatomic gases, cation, anion, (s), (l), (g), (aq), protons, neutrons, electrons, nucleus, mass number, molar mass*
13. What are the **diatomic** elements.
14. **Cations** (gain/lose) electrons to have a (positive/negative) charge. They are normally (metals/nonmetals). **Anions** (gain/lose) electrons to have a (positive/negative) charge. They are normally (metals/nonmetals).
15. **Name** the following compounds: CO_2 NaNO_3 MgCl_2 Fe_2O_3 HF $\text{Pb}(\text{SO}_4)_2$ H_2SO_4
16. **Write** the formula: sulfur trioxide phosphoric acid hydrocyanic acid magnesium nitride
iron(II) oxide iron(III) hydroxide ammonium sulfate
17. Find the **molar mass**:
- $\text{C}_6\text{H}_{12}\text{O}_6$
 - NH_3
 - MgO
 - SO_3
18. **Grams** \Leftrightarrow **mols** \Leftrightarrow **numbers** conversions:
- 80.0 g Ca = _____ mol Ca = _____ atoms Ca
 - 80.0 g $\text{C}_6\text{H}_{12}\text{O}_6$ = _____ mol $\text{C}_6\text{H}_{12}\text{O}_6$ = _____ molecules
 - 9.03×10^{23} atoms Na = _____ mol Na = _____ g Na
 - 5.7 mol P_2O_5 = _____ grams = _____ molecules
 - 855 g MgO = _____ atoms MgO
 - 4.5×10^{23} atoms Ba = _____ g Ba
19. **Balance** the following equations:
- ___ AgNO_3 + ___ NaCl \rightarrow ___ AgCl + ___ NaNO_3
 - ___ NaOH + ___ HCl \rightarrow ___ H_2O + ___ NaCl
 - ___ KClO_3 \rightarrow ___ KCl + ___ O_2
 - ___ $\text{C}_6\text{H}_{12}\text{O}_6$ + ___ O_2 \rightarrow ___ CO_2 + ___ H_2O
 - ___ K + ___ MgBr_2 \rightarrow ___ KBr + ___ Mg
 - ___ CaO + ___ H_2O \rightarrow ___ $\text{Ca}(\text{OH})_2$
20. **Classify the reactions** in question # 19 as *combustion, synthesis, decomp, acid/base, etc.*
21. For this *unbalanced* reaction: $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$
- Balance the equation.
 - How many moles of chlorine gas (Cl_2) would react with 5.0 moles of sodium (Na)?
 - How many grams of NaCl will be produced from 5.0 moles of Na?
 - How many grams of Na will react with 71.0 g of Cl_2 ?
 - 89.0 grams of Na will produce how many moles of NaCl ?