

MIDTERM REVIEW –CHEMISTRY – ANSWER KEY

I. MEASUREMENTS IN CHEMISTRY

- A. Rewrite the following in proper scientific notation and determine the number of significant figures in each number:

Given	Scientific Notation	Significant Figures
2300	2.3×10^3	2
14010	1.401×10^4	4
52.39×10^3	5.239×10^4	4
0.009	9×10^{-3}	1
0.30010	3.0010×10^{-1}	5

- B. Compute the following. Answer with correct number of SigFigs and in Scientific Notation:

301L to mL 3.01×10^5 mL

3.7×10^2 m x 1.0×10^3 m x 1.7×10^1 m 6.3×10^6 m³

Calculate volume of: 3.1cm x 2cm x 4.2cm 3×10^1 cm³

Calculate density (g/mL) of an object whose mass is 14.00kg and whose volume is 362L

$$3.87 \times 10^{-2} \text{ g/mL}$$

What is the heat required to raise 6.25×10^5 g of water from 32.0°C to 96.0°C ($C_{\text{water}} = 4.184 \text{ J/g}^\circ\text{C}$)

$$1.67 \times 10^8 \text{ J}$$

II. MATTER

- A. Identify the following as either a chemical or physical change:

Cutting paper	physical
Crumbling paper	physical
Burning paper	chemical
Paper gets wet	physical

- B. Identify mixture as either homogeneous or heterogeneous:

Black coffee	homogeneous
Muddy water	heterogeneous
Gasoline	homogeneous
Brass	homogeneous

- C. Identify as either a pure substance, compound, mixture, or solution:

Salt	pure substance	compound
Air	mixture	solution
Gold	pure substance	
Sugar water	mixture	solution

III. ATOMIC STRUCTURE

A. Fill in the chart below:

Group	Name	Symbol	#P	#N	#e	Mass
Alkaline Metal	Sodium Ion	Na ⁺¹	11	12	10	23
Halogens 17	Chloride ion	Cl ⁻¹	17	18	18	35
16	Oxygen	O	8	8	8	16
Trans metals	Lead ion	Pb ⁺⁴	82	125	78	207
Trans metals	Uranium	²⁴⁰ ₉₂ U	92	148	92	240
Alkaline Earth Metal	Calcium ion	Ca ⁺²	20	20	18	40
13	Aluminum	Al	13	14	13	27

B. Name two isotopes of Carbon and write their atomic structures in nuclear notation:

Carbon-13: $^{13}_6\text{C}$

Carbon-14: $^{14}_6\text{C}$

Carbon-12: $^{12}_6\text{C}$

C. Where is the majority of the mass of an atom located?

Nucleus

IV. NAMING COMPOUNDS, WRITING FORMULAS, AND CHEMICAL EQUATIONS

A. Write a balanced equation and predict the products for:

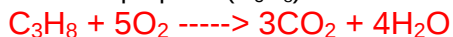
1. The acid-base reaction between nitric acid and magnesium hydroxide



2. Potassium chromate + barium nitrate ---->



3. Combustion of propane (C₃H₈)



4. Iron (III) oxide and Aluminum ---->



5. Decomposition of Lead (IV) oxide



6. Synthesis of Potassium chloride



B. Using the following ions, create and name 4 different compounds:

CO₃ Na Al NO₃ PO₄ OH NH₄

Carbonate (-2), Sodium (+1), Aluminum (+3), Nitrate (-1), Phosphate (-3), Hydroxide (-1), Ammonium (+1)

Compounds made will vary, but must contain (+) and (-) ions in correct ratio to neutralize charges