Name: _____ Test 1

110 points Chemistry 121A

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SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS

Multiple Choice Questions: Circle the single best answer. No penalty for guessing.

1. What is the length of a 1300 cm long block of wood in km? (2 points)

A) 1.3×10^{-6} km **B)** 1.3×10^{0} km **C)** 1.3×10^{-2} km **D)** 1.3×10^{1} km **E)** 1.3×10^{-1} km

2. What is the SI unit of length? (2 points)

A) kilogram **B)** meter **C)** second **D)** coulomb **E)** mole

3. Which of the following is not an element? (2 points)

A) oxygen **B)** krypton **C)** natural gas **D)** carbon **E)** neon

4. What is the density of a coin which weighs 9.1 g and has a volume of 1.6 cm^3? (2 points)

A) 5.7 g/cm^3 **B)** 0.18 g/cm^3 **C)** 10.7 $g\ cm^3$ **D)** 14.6 $g\ cm^3$ **E)** 0.18 cm^3/g

5. Which of the following numbers has the most number of significant digits? (2 points)

A) 0.0005102 **B)** 1,030,000 **C)** 10.8 **D)** 0.0410 **E)** 9.2100

6. The mass of 3.0 mole of chloroform is 358.13 g. Chloroform is made up of 10.06 % (by mass) carbon, 89.09% chlorine and the remainder hydrogen . Calculate the molecular formula of this compound. (10 points)

chloroform molecular formula = _____

7. Write down three different isotopes of carbon with the correct atomic symols, indicating both mass and atomic number. (6 points)

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8. Name the following ionic compounds. (4 points each)

K_2CO_3 _____

Cu_2SO_4 _____

$Ca(OH)_2$ _____

PCl_5 _____

9. Write the empirical formula for the following compounds. (4 points each)

hydrochloric acid _____

sulfur dioxide _____

iron (III) sulfite _____

calcium hypochlorite _____

10. Calculate the molecular weight of the following compounds. (5 points each)

Li_2HPO_4 _____

Testosterone, $C_{19}H_{28}O_2$ _____

11. Calculate the number of moles in a tablespoon of sugar, $C_{12}H_{22}O_{11}$, weighing 12.6 g. (6 points)

moles $C_{12}H_{22}O_{11}$ = _____

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12. Ethylene, C_2H_4 (g), burns in oxygen gas to produce only CO_2 (g) and H_2O (l). Write the balanced equation below. Using this equation, calculate the maximum amount of CO_2 which could be formed when 2.93 g of C_2H_4 reacts with 5.29 g of O_2. (12 points)

CO_2 produced = _____

13. Determine the number of neutrons and protons in a given atom for each of the following elements. (9 points)

Element	Protons	Neutrons
^{190}Os	_____	_____
^{25}Mg	_____	_____
^{35}Cl	_____	_____

14. Balance the following three equations. (15 points)

____ PBr_5 *(s)* + ____ H_2O *(l)* —> ____ H_3PO_4 *(aq)* + ____ HBr *(aq)*

____ Li_3N *(s)* + ____ H_2O *(l)* —> ____ NH_3 *(g)* + ____ LiOH *(aq)*

____ C_4H_9OH *(l)* + ____ O_2 *(l)* —> ____ CO_2 *(g)* + ____ H_2O *(l)*

15. BONUS QUESTION: Describe in no more than 6 sentences the differences between the Dalton model and the Rutherford model of the atom. (5 bonus points)