

Name: _____
110 points
Dr. Jay H. Baltisberger

Test 1
Chemistry 121A
September 25, 1995

SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS

$$N_A = 1 \text{ mole} = 6.02 \times 10^{23}$$

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

- What is the volume of a 2100 cm^3 block of wood in liters? (2 points)
A) $2.1 \times 10^{-6} \text{ L}$ B) $2.1 \times 10^0 \text{ L}$ C) $2.1 \times 10^{-2} \text{ L}$ D) $2.1 \times 10^1 \text{ L}$ E) $2.1 \times 10^{-1} \text{ L}$
- What is the SI unit of time? (2 points)
A) kilogram B) meter C) second D) coulomb E) mole
- Do the following arithmetic with correct significant figures: (2 points)
 $(3.221 + 6.21 - 10.615) / 33.151$
A) 0.035594 B) 0.03559 C) 0.0356 D) 0.036 E) 0.04
- What is the name of the ClO_2^- anion? (2 points)
A) chloride B) sulfate C) chlorate D) chlorite E) perchlorite
- Which of the following numbers has the fewest number of significant digits? (2 points)
A) 0.0027210 B) 3,100 C) 6.88 D) 4.11×10^{-6} E) 11.22
- The mass of 2.00 mole of acetone is 116 g. Acetone is made up of 62.04 % (by mass) carbon, 27.55 % oxygen and the remainder hydrogen . Calculate the molecular formula of this compound. (10 points)

acetone molecular formula = _____

- Define isotope and give an example using the element chlorine. (6 points)

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

$\text{Ba}(\text{NO}_2)_2$ _____

$\text{Cu}_3(\text{PO}_4)_2$ _____

NaCN _____

NCl_3 _____

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

chloric acid _____

diarsenic trioxide _____

chromium (II) bisulfate _____

magnesium hydroxide _____

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

SO_3 _____

$\text{C}_7\text{H}_8\text{O}_2$ _____

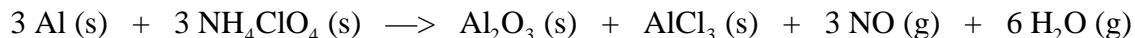
11. Calculate the number of molecules in an average snowflake, H_2O , weighing 5×10^{-5} g.
(6 points)

molecules H_2O = _____

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12. The reusable booster rockets of the U.S. space shuttle use a mixture of aluminum, Al, and ammonium perchlorate, NH_4ClO_4 , for fuel. The reaction between these substances is as follows:



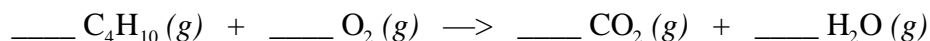
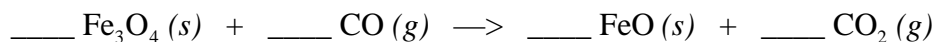
What mass of ammonium perchlorate should be used in the fuel mixture for each kilogram of aluminum?. (12 points)

kg NH_4ClO_4 per kg Al = _____

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

Element	Protons	Neutrons
^{141}Pr	_____	_____
^{85}Rb	_____	_____
^{31}P	_____	_____

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



15. BONUS QUESTION: Describe in no more than 6 sentences the Thompson model of the atom and why this model ultimately failed to adequately describe atoms. (5 bonus points)