

Name: KEY

Chem 121 Test 1B
Fall 2009

PART A: Naming, Fill-in the blank, Significant Figures, Essay – clearly indicate your answer in the spaces provided.

1. (26 pts) Naming and Formulas: Write the correct name/formula.

AsBr ₄	arsenic tetrabromide
Cu ₂ SO ₄ · 5 H ₂ O	copper(I) sulfate pentahydrate
MnO ₂	manganese(IV) oxide
trinitrogen pentachloride	N ₃ Cl ₅
calcium nitride	Ca ₃ N ₂
zinc(II) sulfate dihydrate	ZnSO ₄ · 2 H ₂ O
SeF ₂	selenium difluoride
pentaphosphorus tetrasulfide	P ₅ S ₄
strontium chromate	SrCrO ₄
chromium(III) hydroxide	Cr(OH) ₃
FeS	iron(II) sulfide
Ba(C ₂ H ₃ O ₂) ₂	barium acetate
N ₃ O ₆	trinitrogen hexaoxide

2. (6 pts) Indicate the number of significant figures in each measurement and write the number in correct scientific notation.

Measurement	# of Sig Figs	In Scientific Notation
125.0 mi	4	1.250 × 10 ² mi
0.0890 g	3	8.90 × 10 ⁻² g
56000 cm	2	5.6 × 10 ⁴ cm

3. (6 pts) Fill in the blank with the best correct response.

- The numbers used to balance a chemical equation are called coefficients.
- Atoms with the same number of protons but different numbers of neutrons are called isotopes.
- In a balanced equation, reactants appear on the left and products appear on the right.
- An atom that has lost an electron becomes a(n) cation and an atom that has gained an electron is called a(n) anion. (be specific)

4. (12 pts) Atomic Notation: Fill in the blanks

Element name	Symbol	# of Protons	# of Neutrons	Mass Number
selenium	Se	34	46	80
silicon	Si	14	18	32
cesium	Cs	55	80	135
silver	Ag	47	61	108

5. (10 pts) ESSAY: Answer **ONE** of the following in 4 – 6 grammatically correct sentences

- Describe Millikan's oil drop experiment and what it was used to determine.
- Describe the experiment that discovered the presence of the nucleus.

Read Facets of Chemistry

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PART B: Calculations – show all work for calculations (do nothing in your head, even moving decimal places) to receive full credit.

1. (10 pts) Neon has three naturally occurring isotopes ^{20}Ne , ^{21}Ne and ^{22}Ne . Calculate the average atomic mass.

Isotopic Mass	Percent Abundance
19.9924 u	90.48%
20.9938 u	0.27%
21.9914 u	9.25%

$$\begin{aligned}(19.9924 \text{ u})(0.9048) &= 18.09 \text{ u} \\ (20.9938 \text{ u})(0.0027) &= 0.057 \text{ u} \\ (21.9914 \text{ u})(0.0925) &= 2.03 \text{ u} \\ \hline &20.18 \text{ u}\end{aligned}$$

2. (10 pts) Rutherford's experiment determined that the atomic nucleus is very dense. In fact, it has a density of $2.3 \times 10^{17} \text{ kg/m}^3$. A single hydrogen nucleus contains only one proton. The mass of a proton is $1.6726 \times 10^{-24} \text{ g}$. What is volume (in L) of a hydrogen nucleus? ($1000 \text{ L} = 1 \text{ m}^3$)

$$\begin{aligned}1.6726 \times 10^{-24} \text{ g} &\times \frac{1 \text{ kg}}{1000 \text{ g}} \times \frac{1 \text{ m}^3}{2.3 \times 10^{17} \text{ kg}} \times \frac{1000 \text{ L}}{1 \text{ m}^3} \\ &= 7.2722 \times 10^{-42} \text{ L}\end{aligned}$$

3. (10 pts) The baby penguin that was recently hatched at the Tennessee Aquarium had a birth weight of 0.485 kg. What is this weight in ounces? (16 oz = 1lb, 1 lb = 453.6g)

$$0.485 \text{ kg} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ lb}}{453.6 \text{ g}} \times \frac{16 \text{ oz}}{1 \text{ lb}} \\ = 17.1 \text{ oz}$$

4. (10 pts) The average speed of a garden snail is 0.0468 km/hr. What is this in m/s?

$$\frac{0.0468 \text{ km}}{\text{hr}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}} \\ = 0.0130 \text{ m/s}$$