CHEM 1215	Name	
Exam I		
John I. Gelder	TA's Name	
September 16, 1998		
•	Lab Section	

Please sign your name below to give permission to post your course scores on homework, laboratories and exams. If you do not sign no scores will be posted. All scores will be posted by a random number which will be assigned to you by Dr. Gelder.

## (signature)

## **INSTRUCTIONS:**

			1. This The infor	examination con last page includes mation. All wor	sists of a total of 6 different pages. a periodic table and some useful k should be done in this booklet.
			2. PRIN numl <u>NOT</u> point section	NT your name, T ber <u>now</u> in the sp <u>SEPARATE TH</u> ts for knowing yo on number in wh	A's name and your lab section ace at the top of this sheet. <u>DO</u> <u>IESE PAGES</u> . You will receive 2 bur TA's name AND laboratory ich you are officially enrolled.
			3. Answ for si prob You choice	ver all questions how your work c lems should patte do not have to sh ce (if any) or sho	that you can and whenever called learly. Your method of solving ern the approach used in lecture. how your work for the multiple rt answer questions.
			4. No c prob	redit will be awa lems 7 and 8.	rded if your work is not shown in
			5. Poin	t values are show	n next to the problem number.
			6. Budg prob chall ques comj	get your time for lems may have a enging. If you do tion quickly, skip pleting the easier	each of the questions. Some low point value yet be very o not recognize the solution to a o it, and return to the question after problems.
			7. Look work	through the exam ; then begin.	m before beginning; plan your
			8. Rel	and do well.	
	Page 2	Page 3	Page 4	Page 5	TOTAL
SCORES	(29)	(40)	(26)	(3)	(100)

## CHEM 1215 EXAM I

- (6) 1. Indicate the number of significant figures in each of the following numbers;
  - a) 0.0022022 L 5 significant figures
  - b)  $2.50 \times 10^{-4}$  g **3 significant figures**
  - c) 43,200 m **3 significant figures**
- (6) 2. Round off the number 50,525.09 to the indicated number of significant digits;
  - a) 6 significant figures 50525.1
  - b) 4 sig figs 50530 or 5.053 x  $10^4$
  - c) 2 sig figs 51000 or 5.1 x 10<sup>4</sup>
- (7) 3. Complete each calculation and report the answer to the correct number of significant figures.

a)	104.506 – 6.89	104.506 6.89 97.616 <b>97.62</b>
b)	9.890 x 10 <sup>-2</sup> – 4.3 x 10 <sup>-4</sup>	9.890 x 10 <sup>-2</sup> 0.043 x 10 <sup>-2</sup> 9.847 x 10 <sup>-2</sup>
c)	$0.49 + \frac{1.501 \text{ x } 10^1}{(5.012 + 7.26)}$	$0.49 + \frac{1.501 \times 10^{1}}{(12.27)}$ 0.49 + 1.223 <b>1.71</b>

(10) 4. Diagram each of the following systems as viewed at the atomic level in the space provided. Be sure to clearly label each of the substances in your diagram.



A gaseous solution of neon and nitrogen.



NaCl dissolved in water

(8) 5. Provide the symbol or the proper spelling of the element's name for each of the following elements.

	a)	Р	phosphorus		b)	K	potassium	
	c)	silver	Ag		d)	beryllium	Be	
(8)	6. a)	Write the for sodium and	rmula for the bina oxygen	ary ionic compou Na <sub>2</sub> O	nd fe b)	ormed from the iodine and calc	following pairs	s of elements. CaI <sub>2</sub>
	c)	lithium and l	hydrogen	LiH	d)	nitrogen and m	nagnesium	$Mg_3N_2$

(24) 7. Perform the following conversions;

a) 54.0 miles to meters (use at least 3 conversion factors)

54.0 miles 
$$\left(\frac{5280 \text{ feet}}{1 \text{ mile}}\right)\left(\frac{12 \text{ inches}}{1 \text{ foot}}\right)\left(\frac{2.54 \text{ cm}}{1 \text{ inch}}\right)\left(\frac{1 \text{ meter}}{100 \text{ cm}}\right) = 8.69 \text{ x } 10^4 \text{ m}$$

b)  $1.24 \text{ x } 10^4 \text{ cm}^3$  to gallons

1.24 x 
$$10^4 \text{ cm}^3 \left(\frac{1 \text{ L}}{1000 \text{ cm}^3}\right) \left(\frac{1.0567 \text{ qts}}{1 \text{ L}}\right) \left(\frac{1 \text{ gallon}}{4 \text{ qt}}\right) = 3.28 \text{ gallons}$$

c) 
$$14.9 \frac{g}{cm^3} \text{ to } \frac{lb}{in^3}$$
  
14.9  $\frac{g}{cm^3} \left(\frac{1 \ lb}{454 \ g}\right) \left(\frac{2.54 \ cm}{1 \ in}\right)^3 = 0.538 \ \frac{lb}{in^3}$ 

d) 98.6  $^{\circ}$ F to  $^{\circ}$ C

$$C = \frac{5}{9}(F - 32) = \frac{5}{9}(98.6 - 32) = 37.0 C$$

(8) 8. Assuming the density of blood is 1.06 g⋅mL<sup>-1</sup> and the average person has a mass of 13.31 kg of blood in their body calculate the volume of blood in the body in liters.

13.31 kg 
$$\left(\frac{1000 \text{ g}}{1 \text{ kg}}\right) \left(\frac{1 \text{ mL}}{1.06 \text{ g}}\right) \left(\frac{1 \text{ L}}{1000 \text{ mL}}\right) = 12.6 \text{ L}$$

(8) 9. Complete the following table.

Symbol	# protons	# neutrons	# electrons	charge
${}^{57}_{25}{ m Mn^{5+}}$	25	32	20	5+
$\frac{85}{34}$ Se <sup>2-</sup>	34	51	36	2–

(10)10. Describe one of the three reactions shown in lecture. In your description include the substances that were involved in the reaction and at least two physical properties for each substance; describe the reaction which occurred; and write the name, or formula, for any product(s) formed. Include at least two physical properties for the product(s).

Aluminum, a silvery solid was added to bromine a brownish-red liquid. After the aluminum was added to the bromine it was a minute before the reaction began. When the reaction began it appeared as though the aluminum was on fire as the pieces moved rapidly around the surface of the bromine in the beaker. The product, aluminum bromide, was a white solid. Potassium, a soft silvery solid was added to water, a clear, colorless liquid. A piece of potassium was dropped into a beaker of water. The potassium immediately caught fire emitting a blusih flame and moved rapidly across the surface of the water. One of the products of the reaction is hydrogen, a colorless gas. Phosphorus, a yellow solid was dissolved in carbon disulfide, a clear, colorless liquid and squirted onto a piece of filter paper. The filter paper rested on the top of a graduated cylinder. The carbon disulfide evaporated filling the graduated cylinder. When enough carbon disulfide had evaporated the phosphorus reacted with oxygen, a colorless gas and caught fire, igniting the carbon disulfide in the graduated cylinder evoking a load 'bark'. The product was tetraphosphorus decaoxide, a white solid.



(3) 11. Determine the level of the liquid in the buret.

12.58 mL



	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Lanthanides	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	140.1	140.9	144.2	(145)	150.4	152.0	157.2	158.9	162.5	164.9	167.3	168.9	173.0	175.0
	90	91	92	93	94	95	96	97	98	99	100	101	102	103
Actinides	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
	232.0	231.0	238.0	237.0	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(260)

Useful Information

1 pound (lb) = 453.59237 gram (gm)

1 liter (L) = 1.056718 quart (qt)

1 inch (in) = 2.54 centimeters (cm)

density of water = 
$$1.00 \frac{g}{mL}$$

K = C + 273.15

 $^{\circ}F = \frac{9}{5}^{\circ}C + 32$ 

average atomic mass =  $\Sigma$ (isotopic mass  $\cdot$  fractional abundance)