Chemistry 115
Dr. Cary Willard
Exam 4A

Name ____________________________

December 10, 2008

	Points Earned	Points Possible
Part 1 multiple choice		28
Page 2		25
Page 3		29
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Total		100

All work must be shown to receive credit. Show all answers to the proper number of significant figures.

$N_A = 6.022 \times 10^{23}$/mol
$K = {}^oC+273.16$
$0^oC=273.16\ K$

Grossmont College
Periodic Table

IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIII	VIII	VIII	IB	IIB	IIIA	IVA	VA	VIA	VIIA	NOBLE GASES
1 **H** 1.008																1 **H** 1.008	2 **He** 4.002
3 **Li** 6.941	4 **Be** 9.012											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
11 **Na** 23.00	12 **Mg** 24.30											13 **Al** 27.00	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.06	17 **Cl** 35.45	18 **Ar** 39.95
19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.90	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.70	29 **Cu** 63.55	30 **Zn** 65.38	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** (99)	44 **Ru** 101.1	45 **Rh** 102.9	46 **Pd** 106.4	47 **Ag** 107.9	48 **Cd** 112.4	49 **In** 114.8	50 **Sn** 118.7	51 **Sb** 121.8	52 **Te** 127.6	53 **I** 126.9	54 **Xe** 131.3
55 **Cs** 132.9	56 **Ba** 137.3	57 **La** 138.9	72 **Hf** 178.5	73 **Ta** 180.9	74 **W** 183.9	75 **Re** 186.2	76 **Os** 190.2	77 **Ir** 192.2	78 **Pt** 195.1	79 **Au** 197.0	80 **Hg** 200.6	81 **Tl** 204.4	82 **Pb** 207.2	83 **Bi** 209.0	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226.0	89 **Ac** 227.0	104 **Rf** (261)	105 **Db** (262)	106 **Sg** (263)	107 **Bh** (262)	108 **Hs** (265)	109 **Mt** (266)	110 **??** (269)								

Lanthanide series	58 **Ce** 140.1	59 **Pr** 140.9	60 **Nd** 144.2	61 **Pm** (147)	62 **Sm** 150.4	63 **Eu** 152.0	64 **Gd** 157.3	65 **Tb** 158.9	66 **Dy** 162.5	67 **Ho** 164.9	68 **Er** 167.3	69 **Tm** 168.9	70 **Yb** 173.0	71 **Lu** 175.0
Actinide series	90 **Th** 232.0	91 **Pa** 231.0	92 **U** 238.0	93 **Np** (237)	94 **Pu** (244)	95 **Am** (243)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (252)	100 **Fm** (257)	101 **Md** (258)	102 **No** (259)	103 **Lr** (260)

Part 1 – Multiple Choice (28 points)

1. Which phase change is evaporation?
   a. Solid to liquid
   b. Solid to gas
   c. Liquid to gas
   d. Liquid to solid

2. The vapor pressure of a liquid is the pressure, at equilibrium, of its
   a. Solid above its liquid
   b. Liquid above its solid
   c. Gas above its liquid
   d. Liquid above its gas

3. What type of bond exists between water molecules?
   a. Polar covalent
   b. Nonpolar covalent
   c. Ionic
   d. Hydrogen bond

4. At which temperature would CO_2 gas be most soluble?
   a. 10. ^oC
   b. 20. ^oC
   c. 30. ^oC
   d. 40. ^oC

5. Which is the hydronium ion?
   a. H^{+1}
   b. H_3O^{+1}
   c. OH^{-1}
   d. OH_2^{-1}

6. Which pH is most acidic?
   a. 3
   b. 7
   c. 9
   d. 14

7. What is the conjugate base of NH_3?
   a. NH_2^{-1}
   b. NH^{-2}
   c. NH_4^{+1}
   d. H^{+1}

8. A beta particle has
   a. A mass of 4 amu
   b. A charge of +4
   c. A charge of -1
   d. Neither mass nor charge

9. In which type of reaction does a heavy nucleus absorb a neutron, split to form two or more intermediate sized fragments, and release at least two neutrons?
   a. Alpha decay
   b. Beta decay
   c. Fission
   d. Fusion

10. Which compound is organic?
    a. HOH
    b. NaOH
    c. HCl
    d. CH_4

11. Which hydrocarbon series contains a double covalent bond between carbon atoms?
    a. Alkynes
    b. Alkenes
    c. Alkanes
    d. Aromatics

12. Starches are examples of
    a. Carbohydrates
    b. Proteins
    c. Lipids
    d. Nucleic acids

13. Fats and oils are called

a. Monoglycerides
b. Diglycerides
c. Triglycerides
d. Tetraglycerides

14. The most abundant steroid in the human body is

a. Testosterone
b. Progesterone
c. Estrogen
d. Cholesterol

Part 2 – Problems and Questions (72 points)

1. (8 points) Fill in the chart below

IUPAC name	Molecular formula
Nitric acid	
Hydrochloric acid	
	H_2SO_4
	H_2S

2. (5 points) Which liquid is more viscous, water or motor oil? In which liquid do you suppose the intermolecular attractions are stronger? Explain.

3. (6 points) What mass (g) of 63.7% solution can be prepared from 22.4 g of MgS?

4. (6 points) Calculate the molarity of a solution prepared by dissolving 38.5 g of SrO in enough water to make 600.0 ml of solution.

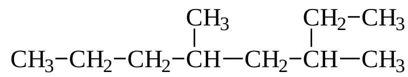
5. (6 points) 33.6 ml of 0.903 M $H_2C_2O_4$ is diluted to 150.0 ml. What is the molarity of the resulting solution?

6. (6 points) A solution has an H_3O^+ concentration of 5.83×10^{-2} M. Determine $[OH^-]$, pH, and pOH.

7. (6 points) A 25.00 ml sample of vinegar was titrated with 29.64 ml of 0.4052 M NaOH. Calculate the molarity of acetic acid in the vinegar sample.
   a. $HC_2H_3O_2 + NaOH \longrightarrow NaC_2H_3O_2 + H_2O$

8. (6 points) Differentiate between fusion and fission based on your knowledge of nuclear chemistry?

9. (5 points) Gold-198 is a beta emitter used to assess kidney activity. Write the equation for the decay of gold-198.

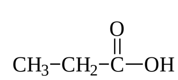
10. (3 points) Give the IUPAC name of 

11. (3 points) Give the IUPAC name of $CH_3{-}CH_2{-}C{\equiv}C{-}CH_3$.

12. (3 points) Draw a condensed structural formula for 2,2,4-trimethylhexane.

13. (3 points) Draw a condensed structural formula for 1-butyne.

14. (3 points) What kind of functional group is represented by $CH_3{-}NH_2$?

15. (3 points) What kind of functional group is represented by  ?