

Name: \_\_\_\_\_

**CHEM 1110 Test 1A**  
**Spring 2011, Dr. Potts**

**PART A: Fill-in the blank and Essay** – clearly indicate your answer in the spaces provided. You may **NOT** use a calculator for Part A.

1. (4 pts) Indicate whether each of the following is a chemical change (C) or a physical change (P)

Change	P or C	Change	P or C
Acid rain destroying a marble statue		Chopping a wooden log	
Boiling soup in a pot		Burning a wooden log	

2. (9 pts) Complete the following table

Element name	Symbol	# of Protons	# of Neutrons	Mass Number
			72	120
	Zr			95
		82	128	

3. (12 pts) Give the name and the formula of the ionic compounds formed from the following

Elements	Chemical Name	Formula
sodium and oxygen		
phosphorus and potassium		
calcium and bromine		

4. (12 pts) Naming and Formulas: Write the correct name/formula.

$\text{Co}_3(\text{PO}_4)_2$	
dinitrogen pentoxide	
$\text{ICl}_3$	
mercury(II) acetate trihydrate	
$\text{Cr}(\text{OH})_3$	
$\text{Br}_2\text{O}_4$	

5. (6 pts) Write the following numbers in scientific notation with the indicated number of significant figures.

Measurement	Scientific Notation
33.259 (3 SF)	
0.00024569 (4 SF)	
1250039 (2 SF)	

6. (7 pts) Fill in the blank with the best correct response.
- The symbol and group number of the transition element whose atoms have the fewest protons are \_\_\_\_\_ and \_\_\_\_\_.
  - The class of elements that lies on the staircase line in the periodic table are termed \_\_\_\_\_.
  - The Group IA elements are termed the \_\_\_\_\_ and the Group IIA elements are termed the \_\_\_\_\_.
  - What is the chemical symbol for the element in the third period that has the same properties as oxygen? \_\_\_\_\_
  - What charge does phosphorus have when it is an ion? \_\_\_\_\_
7. (10 pts) ESSAY: Answer **ONE** of the following in **4 – 6 grammatically** correct sentences
- Describe the experiment that determined the charge and mass of the electron.
  - Describe the basics of a mass spectrometer.

	IA																		VIIIA
1	H 1.008																		He 4.00
2	Li 6.94	Be 9.01																	
3	Na 22.99	Mg 24.31																	
4	K 39.10	Ca 40.08	Sc 44.96	Ti 47.90	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.71	Cu 63.55	Zn 65.37	Ga 69.72	Ge 72.59	As 74.92	Se 78.96	Br 79.90	Kr 83.80	
5	Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.94	Tc [98]	Ru 101.1	Rh 102.9	Pd 106.4	Ag 107.9	Cd 112.40	In 114.8	Sn 118.7	Sb 121.8	Te 127.60	I 126.90	Xe 131.30	
6	Cs 132.9	Ba 137.3	Lu 175	Hf 178.5	Ta 181	W 183.9	Re 186.2	Os 190.2	Ir 192.2	Pt 195.1	Au 197	Hg 200.59	Tl 204.4	Pb 207.2	Bi 209	Po [209]	At [210]	Rn [222]	
7	Fr [223]	Ra [226]	Lr [262]	Rf [267]	Db [268]	Sg [271]	Bh [272]	Hs [270]	Mt [276]	Ds [281]	Rg [280]	Uub [285]	Uut [284]	Uuq [289]	Uup [288]	Uuh [293]		Uuo [294]	
	57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm [145]	62 Sm 150.4	63 Eu 152	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.93	68 Er 167.3	69 Tm 168.9	70 Yb 173					
	89 Ac [227]	90 Th 232	91 Pa [231]	92 U 238	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]					

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

1. (10 pts) An unknown element has three naturally occurring isotopes. Calculate the average atomic mass and identify the element.

Isotopic Mass	Percent Abundance
38.9637 u	93.26%
39.9640 u	0.0117%
40.9618 u	6.730%

Element Identity (spell, do not use symbol): \_\_\_\_\_

2. (10 pts) Yao Ming is the tallest player in the NBA, listed at 7.50 ft tall. Unfortunately, he currently has a stress fracture and is sitting out the rest of the season. What is Mr. Ming's height in meters? (2.54 cm = 1 in)

3. (10 pts) Liquid mercury has a density of 13.534 g/mL. If a barometer (used to measure pressure) requires 0.688 gal of mercury to operate, what is the mass of mercury (in kg) that is required for the barometer to operate? (1 gal = 3.785 L)

4. (10 pts) A steel ball-bearing with a **diameter** of 0.0100m weighs 4.20 g. What is the density of the ball bearing in g/cm<sup>3</sup>? (Volume of a sphere =  $\frac{4}{3}\pi r^3$ )