Exam	II General Chemistry I Lecture Spring 2014 3/4/14 Tuesday form 8:30 A Dr.	Hahn Exam#
Name_	(print) Name	(sign)
choice o	show work for partial credit and full credit on the Long Answers and in some of the Stages questions have no partial credit. Please write anything you want graded legibly. It is print and sign exam. If you run out of space, please continued clearly tell me where the remaining answer can be found.	If I cannot read your work, I
Part I partial	MULTIPLE CHOICE. Choose the one alternative that best completes the statement of the statem	nt or answers the question. No
	1) Determine the name for NO2  A) nitrogen (IV) oxide B) nitrogen (II) oxide C) nitrogen tetroxide D) dinitrogen pentoxide E) nitrogen dioxide	1 + ide 1)
	Which of the following exists as a diatomic molecule?     A) carbon	2)
	B) lithium C) phosphorus D)hydrogen E) krypton	
	3) Which of the following is an ionic compound?  (A) Mg3(PO4)2 - Polyatonic 10n  (B) SF2  (C) PBr5  (C) C+H Ereat as if close  (C) C+D E) Cl2O  (E) Cl2O  (E) Gether in geriodic tab	Je) 3) A
	4) Which one of the following compounds is insoluble in water?  A) Ca Cl <sub>2</sub> B) Pb Cl <sub>2</sub> C) K <sub>2</sub> CO <sub>3</sub> D)	4) <u>B</u> NaNO3
	5) Which of the following solutions will have the highest concentration of chloride ior  (A)0.10 M AlCl <sub>3</sub> (O,   0) # 3  B) 0.10 M MgCl <sub>2</sub> (O,   0) # 2  C) 0.05 M CaCl <sub>2</sub> (O, 05) # 2  D) 0.10 M LiCl (O,   0)  E) All of these solutions have the same concentration of chloride ions.	ns? 5) <u>A</u>
•	6) What is the concentration of nitrate ions in a 0.125 M Mg(NO <sub>3</sub> ) <sub>2</sub> solution?  A) 0.0625 M  B) 0.250 M  C) 0.125 M  D) 0.160 M	6) <u>B</u> E) 0.375 M
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7	) Identify the compour	nd with covalent b	onds.			71 ←
	A) Kr	B) KBr	C) Li	D) NaCl	E CH <sub>4</sub>	//
8	) Determine the molec empirical formula of	ular formula of a c C <sub>2</sub> H <sub>5</sub> O <sub>2</sub> .	ompound that has a	molar mass of 183.2	g/mol and an	8) <u></u>
	A) C <sub>8</sub> H <sub>20</sub> O <sub>8</sub>	B) C <sub>3</sub> H <sub>7</sub> O <sub>3</sub>	C) C <sub>2</sub> H <sub>5</sub> O <sub>2</sub>	D) C <sub>4</sub> H <sub>10</sub> O <sub>4</sub>	E)C <sub>6</sub> H <sub>15</sub> O <sub>6</sub>	
9)	An ionic bond is best  A) the attraction be  B) the transfer of e  C) the attraction be  D) the attraction th  E) the sharing of elements	etween 2 metal ator electrons from one a etween 2 nonmetal nat holds the atoms	atom to another.	omic ion.		9) <u>B</u>
10)	Give the name for H <sub>2</sub> A) persulfuric acid B) hyposulfurous ac C) persulfurous acid D) sulfurous acid	acid				10)
	sulfuric acid					
11)	Calculate the molar m A) 123.76 g/mol B) 119.52 g/mol C) 247.52 g/mol D) 75.76 g/mol E) 223.21 g/mol	nass for Mg(ClO <sub>4)2</sub>				11)
12)	Give a possible molect A) $C_6H_{10}O_2$ B) $C_5H_{10}Cl_2O_2$ C) $C_6H_{10}ClO_2$ D) $C_6H_{10}Cl_2O_2$ E) $C_6H_{12}Cl_2O_2$	ular formula for C	BH5CIO.			12)

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

1. From the list of molecules shown below circle all ionic compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)

1				
MgCl <sub>2</sub>	C <sub>6</sub> H <sub>6</sub>	NH <sub>4</sub> Br	PCl <sub>5</sub> Na <sub>3</sub> PC	KNO <sub>3</sub>

2. Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)

Ba and Cl

a. charge on Ba 
$$+2$$
 charge on Cl  $-1$  (4 pts, 2 pts each)

Group #  $-3 = -1$ 

b. correct formula is  $-1$  (4 pts)

 $+2$  Ba  $+1$  (4 pts)

- 3 Nomenclature (4 pts, 2 pts each)
- a. **penta** is the number prefix for the number

b Given the following formula of the polyatomic ions, give the name of the polyatomic ion:

4. For the molecule Ba (NO<sub>3</sub>)<sub>2</sub> (molar mass = 261.35 g/mol), how many moles is 1782.2 grams of the compound? (show work) (5 pts)  $\frac{1}{12} \frac{1}{12} \left( \frac{1}{12} \frac{$ 

(show work) (5 pts)

# 
$$noley = 1782.29 \times \frac{8a(n0)2}{261.359} = 6.8192$$
 $8a(n0)2 \frac{261.359}{8a(n0)2} = 6.8192$ 

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5 a. Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)

 $Cr_2O_3(s) + 2 Al(l) + 2 Cr(l) + Al_2O_3(s)$ 

b. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (4 pts)

2 Cr, 70, 2 M 2 Cr, 2 Al, 30

6. (a). Is the compound PbCl<sub>2</sub> [(soluble) or (insoluble)] (circle one) in water? (2 pt)

Cl- soluble - exception

(b) Write out the molecular form of the following precipitation reaction giving the expected products by (1) filling in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not need to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)

 $Pb(NO_3)_2 + CaCl_2 \rightarrow PbCl_2$  (s)or (aq)] circle one  $+Ca(V)_2$  [(s) or (aq)] circle one

<u>Part III.</u> <u>Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite
the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the  $K_2O$  in moles if you start with 27.8 moles of K (s). Show work. (7 pts)

$$4 \text{ K (s)} + O_2(g) \rightarrow 2 \text{ K}_2O(s)$$

b. If the formula mass of  $K_2O$  is 94.20 g/mole, what is the theoretical yield in grams [based on the number of moles of  $K_2O$  from part (a)]? Show work. (6 pts)

c. Your yield of the is  $K_2O$  from the number of moles of K (s) is 12Q moles (1 pt) [from your calculated results from part (a)]. If your number of moles of the  $K_2O$  [from the number of moles of starting  $O_2$ ] is given to be 20.7 mol  $K_2O$ , which is the limiting reagent?

- 2. How many grams of Ba(OH)<sub>2</sub> do you have in 345 mL of a 1.00 M solution? (17 pts) To answer this question, complete the following
  - a. Rewrite the 1.00 M in terms of 1.00 moles in 100 mL of solution (6 pts)
  - b. How many moles of Ba(OH)<sub>2</sub> do you have? (4 pts) Show work.

$$345 \text{ mel} \times \frac{1,00 \text{ mel Ba}(0 \text{ mel})_2}{1000 \text{ mel}} = 0.345 \text{ mel}$$
 $50 \text{ ln.}$ 
 $100 \text{ mel}$ 
 $100 \text{$ 

c. What is the formula mass of the Ba(OH)<sub>2</sub> ? (4 pts) Show work.

$$\begin{array}{c} & \text{201n} \\ \text{ne formula mass of the Ba(OH)}_{2} ? \text{ (4 pts) Show work.} \\ & 147,33 + (2 * 16,0) + 2(1,01) = 171,359 \\ & \text{Ba(OH)}_{4} \text{ hol} \\ & \text{Ba(ah)}_{4} \end{array}$$

d. How many grams of the Ba(OH)<sub>2</sub> do you have in the 345 mL of solution? (3 pts) Show work.

$$0.945 \text{ mol} \times 171.959 \text{ Ba(OH)}_2 = 59.19$$
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Same 4}$ 
 $\text{Ba(OH)}_2$ 
 $\text{Soln}$ 
 $\text{Ba(OH)}_2$ 
 $\text{Soln}$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 
 $\text{Ba(OH)}_2$ 

					On	ange
Exam II	General Chemistry I	Lecture Spring 20	014 3/4/14 Tueso	lay form 8:30 B	Dr. Hahn	Exam #
	V ni					
Name	- Fly		_(print) Name_			(sign)
choice qu obviously exam and	estions have no partia	edit and full credit on the credit. Please we'll the print and sign exa the remaining answ	on the Long Answerite anything you am) If you run or are can be found.	ers and in some of want graded legib ut of space , please	the Short Ans ly. If I cann e continue on	the back page of the
partial cr	edit for MC. (2 pts pe	r question, 24 pts pt	ts total)	completes the sta	tement or ans	wers the question. No
1)	Which one of the foll	owing compounds i	s insoluble in wat	er?		1)
	A) NaNO3	B) K2CO3	(C) P	b Cl <sub>2</sub>	D) Ca Cl <sub>2</sub>	
2)	Determine the molectempirical formula of	ular formula of a co C2H5O2.	mpound that has a	molar mass of 18	3.2 g/mol and	an 2) <u></u>
	A) C <sub>3</sub> H <sub>7</sub> O <sub>3</sub>	B) C <sub>8</sub> H <sub>20</sub> O <sub>8</sub>	C) C <sub>2</sub> H <sub>5</sub> O <sub>2</sub>	D C <sub>6</sub> H <sub>15</sub> O <sub>6</sub>	6 E) C <sub>4</sub>	H <sub>10</sub> O <sub>4</sub>
3)	Give the name for H2	SO <sub>4</sub> .				3) B
,	A) persulfurous ac B) sulfuric acid C) persulfuric acid D) sulfurous acid E) hyposulfurous acid	id				3) <u> </u>
4)	Determine the name t	for NO2.				10 A
·	(A) nitrogen dioxide					*) <u> </u>
	B) nitrogen tetroxi					
	C) dinitrogen pente	oxide				
	D) nitrogen (IV) ox					
	E) nitrogen (II) oxi	de				
5)	Which of the followin A) 0.10 M LiCl B) 0.10 M MgCl <sub>2</sub> C) 0.05 M CaCl <sub>2</sub>	g solutions will hav	e the highest conc	entration of chlori	de ions?	5)
	D 0.10 M AICl <sub>3</sub>					
	<u> </u>	tions because the control				
	E) An of these som	tions have the same	concentration of o	hloride ions.		
6)	Calculate the molar m	nass for Mg(ClO <sub>4</sub> ) <sub>2</sub> .				6 A
	(A) 223.21 g/mol					·/ <del>-/ /</del>
	B) 119.52 g/mol					•
	C) 247.52 g/mol					
	D) 75.76 g/mol					
	E) 123.76 g/mol					

	olecular formula for	C <sub>3</sub> H <sub>5</sub> ClO.			$_{7)}$ $\mathcal{D}$
A) C <sub>6</sub> H <sub>12</sub> Cl <sub>2</sub> C	2				,
B) C <sub>6</sub> H <sub>10</sub> O <sub>2</sub>					
C) C <sub>6</sub> H <sub>10</sub> ClO <sub>2</sub>					
D C <sub>6</sub> H <sub>10</sub> Cl <sub>2</sub> O					
E) C <sub>5</sub> H <sub>10</sub> Cl <sub>2</sub> O	2				
8) Which of the follo	wing exists as a diate	omic molecule?			. ()
A) phosphorus	0	mae morecure:			8)
B) krypton					
C) carbon					
D)hydrogen E) lithium					
ե) ուսաստ		•			
9) An ionic bond is b	est described as				. C
	that holds the atom	s together in a poly	atomic ion		9)
b) the attraction	i between 2 nonmeta	Latoms	utonic for		
Of the transfer of	of electrons from one	atom to another.			
D) the sharing o	t electrons,				
E) the attraction	between 2 metal ato	oms.			
10) Which of the follow	ving is an ionic comr	oound?			B
A) CH <sub>2</sub> O	O · · · · · · · · · · · · · · · · · · ·	ound.			10)
$\bigcirc$ Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>					
C) SF <sub>2</sub>					
D) PBr <sub>5</sub>					
E) Cl <sub>2</sub> O					
11) What is the concent	tration of nitrate ions	in a 0.125 M Mg(N	IO3)2 solution?		11) A
(A) 0.250 M	B) 0.0625 M	C) 0.375 M	D) 0.160 M	E) 0.125 M	11)
			,	D) 0.125 W	
12) Identify the compo					12)
A) NaCl	B) Kr	C) Li	(D))CH4	E) KBr	, <u></u>

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

1. From the list of molecules shown below circle all covalent compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)

MgCl<sub>2</sub> (C<sub>6</sub>H<sub>6</sub>) NH<sub>4</sub>Br (PCl<sub>5</sub>) Na<sub>3</sub>PO<sub>4</sub> KNO<sub>3</sub>

2. Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)

Na and O

a. charge on Na + | charge on O - | (4 pts, 2 pts each)

b. correct formula is - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | +

- 3 Nomenclature (4 pts, 2 pts each)
- a. octa is the number prefix for the number

b Given the following formula of the polyatomic ions, give the name of the polyatomic ion:

PO43 phosptate

4. For the molecule Ba  $(NO_3)_2$  (molar mass = 261.35 g/mol), how many moles is 82.2 grams of the compound? (show work) (5 pts)

 $82.29 \times \frac{1 \text{ mol } \text{ ba}(NO_{2})_{2}}{261.459} = 0.315 \text{ byl}$   $\text{ba}(NO_{2})_{2}$   $\text{ba}(NO_{3})_{3}$ 

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Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)

 $L_{Sn(s)} + L_{Cl_2(g)} \Rightarrow SnCl_4(l)$ 

Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (4 pts)

5

[(soluble) or (insoluble)] (circle one) in water? (2 pt) 6. (a). Is the compound CaS

5-2 insoluble, Catz is exceptible

(b) Write out the molecular form of the following precipitation reaction giving the expected products by (1) filling in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not need to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)

CaS + MgCl<sub>2</sub>  $\rightarrow$  (s) or (aq)] circle one +  $\frac{1}{1}$  (s) or (aq)] circle one

<u>Part III.</u> <u>Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite
the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the  $K_2O$  in moles if you start with 47.7 moles of K(s). Show work. (7 pts)

 $4 \text{ K (s)} + O_2(g) \rightarrow 2 \text{ K}_2O(s)$ 

47.7 md x 2 mal K20 = 23.9 mal K 4 mal K20

b. If the formula mass of K<sub>2</sub>O is 94.20 g/mole, what is the theoretical yield in grams [based on the number of moles of K<sub>2</sub>O from part (a)]? Show work. (6 pts)

23.9 rul  $k_z$ 0 x  $\frac{9420gk_z0}{hol k_z0}$  = 2250gkz0 41.1 raf x  $\frac{2halk_z0}{k_z}$   $\frac{942gk_z0}{molk_z0}$   $\frac{942gk_z0}{k_z0}$  moles (1 pt) [from

c. Your yield of the is  $K_2O$  from the number of moles of K (s) is 2 4 moles (1 pt) [from your calculated results from part (a)]. If your number of moles of the  $K_2O$  [from the number of moles of starting  $O_2$ ] is given to be 13.9 mol  $K_2O$ , which is the limiting reagent?

[(K) or (O<sub>2</sub>)] (circle one) (3 pts)

K → 23.9 mel K20 02 → 13.9 mel K20 = lemiting relight

- 2. How many grams of (NH<sub>4</sub>)<sub>2</sub>S do you have in 15.7 mL of a 2.55 M solution? (17 pts) To answer this question, complete the following.
  - a. Rewrite the 2.55 M in terms of 2.55 moles in 6000 mL of solution (6 pts)

b. How many moles of (NH<sub>4</sub>)<sub>2</sub>S do you have ? (4 pts) Show work.

$$\frac{15.1 \text{ me} \times \frac{2.55 \text{ mol}(N + 4)_{5} 5 \text{ soln}}{1000 \text{ me}} = 0.0400 3 \text{ sig}}{(N + 4)_{2} 5}$$

$$\frac{15.1 \text{ me} \times \frac{2.55 \text{ mol}(N + 4)_{5} 5 \text{ soln}}{(N + 4)_{2} 5} = 0.0400 3 \text{ sig}}{(N + 4)_{2} 5}$$

$$\frac{15.1 \text{ me} \times \frac{2.55 \text{ mol}(N + 4)_{5} 5 \text{ soln}}{(N + 4)_{2} 5} = 0.0400 3 \text{ sig}}{(N + 4)_{2} 5}$$

c. What is the formula mass of the (NH<sub>4</sub>)<sub>2</sub>S? (4 pts) Show work.

$$2(14.01) + 8(1.01) + 32.01 = (8.17)$$

d. How many grams of the (NH<sub>4</sub>)<sub>2</sub>S do you have in the 15.7 mL of solution? (3 pts) Show work.

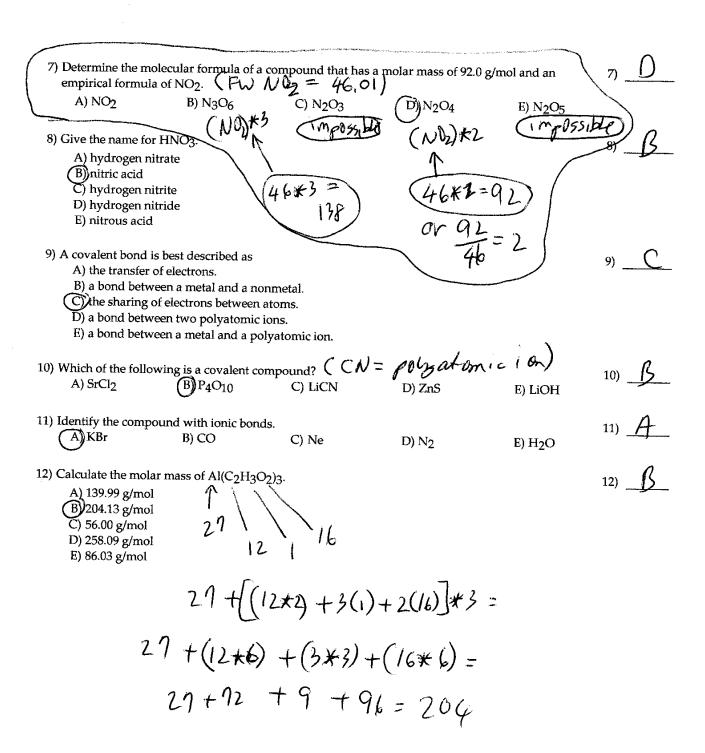
0.0400 mal 
$$\times$$
  $\frac{(88.17 \text{ g})(NH4)_2S}{mal(NH4)_2S} = 2.73 \text{ g}$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 

Soln

 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 
 $(NH4)_2S$ 

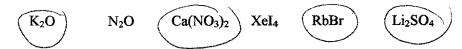
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Exam			ry I Lecture Sp	ring 2014	3/4/14 Tuesday	y form 9:55 A	Dr. Hahn	Exam #	····
Name_		-ly		(pr	int) Name			(sign	n)
cnoice o obviou:	questions sly canno	s have no par ot grade it. (1	credit and full tial credit. Pl pts print and s ere the remainin	credit on the ease write a ign exam)	Long Answers nything you wa If you run out	and in some of	the Short Answer	nt read your wo	rk I
Part I partial	MULTII credit for	PLE CHOIC r MC. (2 pts	E. Choose the oper question, 24	one alternati 4 pts pts tota	ive that best cor al)	mpletes the sta	tement or ansv	vers the questi	on. No
		is the molar 0.450 M	concentration o B) 0.1	f sodium ior 150 M	ns in a 0.450 M I C) 1.80	Na3PO4 solutio	on? D)1.35 M	1) _	D
	A) s		ogen sulfite	inary	ionio	0,4	D)1.35 M	2) _	D
	(D)	sodium sulfi sodium hydr sodium sulfi sodium sulfi	ogen sulfate ate	Wit	h poh	zatoni	c <u>ion</u> =;	Sulfate	
	A) p B)t C) c D) k	of the follow ohosphorus oromine carbon crypton ithium	ving exists as a a	diatomic mo aloge:	olecule?	diatom	ic	3) _	B
•	A) 0 B) 0 D) 0	0.40 M CaCl <sub>2</sub> 0.40 M MgCl <sub>2</sub> 0.60 M AlCl <sub>3</sub> 0.20 M LiCl	ving solutions w $-(0,40) + 2$ $-(0,40) *$ $-(0,60) *$ $-(0,20)$ blutions have the	· 2 · 3			de ions?	4)	<u>C</u>
	A) H B)H C) H D) H	s the empirion Ig2NO3 IgNO3 Ig4(NO3)4 Ig2(NO3)2 Ig(NO3)2	al formula for I	1g2(NO <sub>3</sub> )27	C	ommon di	e Mmi nal	<sup>L</sup> 0- =2 5) _	B
6	6) Which A P	one of the fo b(NO3)2	llowing compor B) Cos		ble in water? C) ZnC(	D <sub>3</sub>	D) Cu3(PO <sub>4</sub>	6)	<u>A</u>

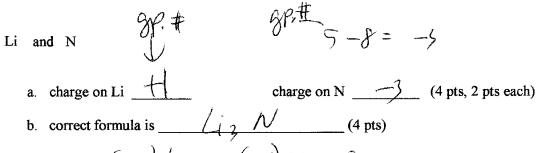


Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

1. From the list of molecules shown below circle all ionic compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)



2. Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)



$$(+1)4i + (-1)N = 0$$

- 3 Nomenclature (4 pts, 2 pts each)
- a. **tri** is the number prefix for the number
- b Given the following formula of the polyatomic ions, give the name of the polyatomic ion:

CH<sub>3</sub>COO (also can be written C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>)

4. For the molecule  $CO_2$  (with molar mass = 44.01 g/mol), how many moles is 24.77 grams of the compound? (show work) (5 pts)

$$24.11g Co_2 \times \frac{mol}{44.01g} = 0.5628 \text{ mol}$$

Dr. Hahn General Chemistry I Lecture Exam II Spring 2014 form (9:55 T,R form A) page 3

5	a.	Balance the following reaction by filling in the	blanks. (4 pts, 2 pts per blank
---	----	--	---------------------------------

2 N <sub>2</sub> (g) +	$O_2(g) \Rightarrow 2$	N <sub>2</sub> O(g)

b. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (4 pts)



- 6. (a). Is the compound Na<sub>2</sub>SO<sub>4</sub> ((soluble) or (insoluble)] (circle one) in water? (2 pt) 504 50 Wble, Na Work exception
- (b) Write out the molecular form of the following precipitation reaction giving the expected products by (1) filling in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not need to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)

NaCl + Ag<sub>2</sub>SO<sub>4</sub> 
$$\rightarrow \frac{M_2 S \hat{U}_{4}}{\sqrt{2}}$$
 [(s) or (aq)] circle one +  $\frac{M_2 S \hat{U}_{4}}{\sqrt{2}}$  [(s) or (aq)] circle one

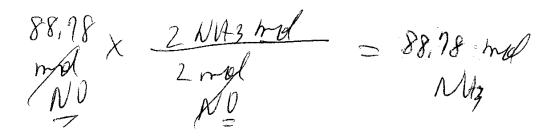
<u>Part III.</u> <u>Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite
the question with no change in anything.\*\*\*\*

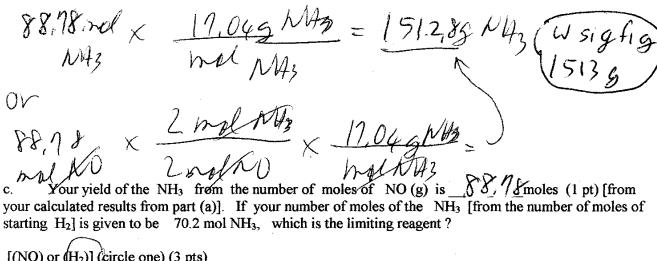
Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the NH<sub>3</sub> in moles if you start with 88.78 moles of NO (g). Show work. (7 pts)

 $2NO(g) + 5 H_2(g) \rightarrow 2 NH_3(g) + 2 H_2O(g)$ 



b. If the formula mass of NH<sub>3</sub> is 17.04 g/mole, what is the theoretical yield in grams [based on the number of moles of NH<sub>3</sub> from part (a)]? Show work. (6 pts)



[(NO) or (H<sub>2</sub>)] (circle one) (3 pts)  $NU \longrightarrow 88.78 \text{ rol } NH3$   $L_{2} \longrightarrow 70.2 \text{ rol } NH3 \longrightarrow NH3$ 

Dr. Hahn General Chemistry I Lecture Exam II Spring 2014 form (9:55 T,R form A) page 5

- in enough water to make up 225 mL of solution, what If you dissolve 78.9 grams of Mg(NO<sub>3</sub>)<sub>2</sub> 2 is the molarity of the solution? To answer this question, complete the following. (17 pts)
  - a. What is the molar mass of the Mg(NO<sub>3</sub>)<sub>2</sub> ? (3 pts) Show work

b. How many moles of the Mg(NO<sub>3</sub>)<sub>2</sub> do you have ? (5 pts) Show work.

$$78.99 \times \frac{n_1 \ln m_2(N03)_2}{148.339} = 0.532 mol$$
 $\frac{1}{148.339} + \frac{1}{148.339} + \frac{1}{148.$ 

c. How many Liters of the solution do you have? (4 pts) Show work.

d. What is the molarity of the  $Mg(NO_3)_2$  solution? (5 pts) Show work.

$$\frac{h_{1}h_{2}(\lambda 0)_{1}=0.532ml}{ng(\lambda 0)_{2}}=\frac{ng(\lambda 0)_{2}}{0.225l}=2.36m$$

Green

Exam	II General Chemistry I			-		.#
Name	- Kly		(print) Name			(sign)
choice obviou	show work for partial creations have no partial usly cannot grade it. (1 pt and clearly tell me where	edit and full credi credit. Please s print and sign e	t on the Long Ansv write anything you xam) If you run o	vers and in some of t want graded legibly	he Short Answer Qu v. If I cannot read	your work, I
Part I partia	MULTIPLE CHOICE. (  credit for MC. (2 pts per	Choose the one a question, 24 pts	lternative that bes pts total)	t completes the state	ment or answers th	ne question. No
	1) Which of the followin A) LiOH	g is a covalent co B) ZnS	mpound? C) LiCN	D)P <sub>4</sub> O <sub>10</sub>	E) SrCl <sub>2</sub>	1)
	2) Which of the followin  (A) 0.60 M AlCl <sub>3</sub> B) 0.40 M CaCl <sub>2</sub> C) 0.40 M MgCl <sub>2</sub>	g solutions will h	ave the highest cor	ncentration of chlorid	le ions?	2)
	D) 0.20 M LiCl E) All of these solu	tions have the sa	me concentration o	f chloride ions.		
	3) What is the empirical A) Hg2NO3 B) Hg4(NO3)4 HgNO3 D) Hg2(NO3)2 E) Hg(NO3)2	formula for Hg <u>2</u> (	(NO <sub>3</sub> ) <sub>2</sub> ?			3)
	4) Identify the compoun A) Ne	d with ionic bond B) CO	ls. C) N <sub>2</sub>	D) H <sub>2</sub> O	E KBr	4)
	5) A covalent bond is be A) a bond between B) a bond between C) the sharing of ele D) the transfer of ele E) a bond between	a metal and a pol a metal and a nor ectrons between a ectrons.	nmetal. atoms.			5)
	6) Determine the name for A) nitrogen tetroxic (B) nitrogen dioxide (C) dinitrogen pento (D) nitrogen (II) oxide (E) nitrogen (IV) oxide	xide le				6) <u>B</u>
	7) What is the molar con A) 0.450 M	centration of sodi B) 0.150 M		M Na3PO4 solutiona 1.35 M	D) 1.80 M	7) <u>C</u>
	Dr. Hahn General Chen	nistry I Lecture	Exam II	Spring 2014	9:55 form B p	age 1

8) Calculate the mo	lar mass of Al(C <sub>2</sub> H <sub>3</sub>	$O_2)_3$			8)
A) 86.03 g/mol					v) <u>-</u>
(B) 204.13 g/m					
C) 258.09 g/m					
D) 56.00 g/mol					
E) 139.99 g/m					
9) Give the name fo	r HNO2.				9) A
A) nitric acid					9)
B) hydrogen n	itride				
C) hydrogen n					
D) nitrous acid					
E) hydrogen n					
, ,					
10) Determine the mo	olecular formula of a	compound that has	a malar mass of 02 (	) - <i>l</i> 1	100
empirical formula	of NO2. (Fi	1.00 = 46		g/moi and an	10)
Δ\ N(O <sub>2</sub>	a of NO <sub>2</sub> . (FW B) N <sub>2</sub> O <sub>5</sub>	C N-O			
11) 1102	b) N2O5	C) N306	$D N_2O_4$	E) N <sub>2</sub> O <sub>3</sub>	
11) Which of the falls					~
<ol> <li>Which of the follom</li> <li>A) carbon</li> </ol>	wing exists as a diat	omic molecule?			11)
•					_
B) krypton					
C) phosphorus D) lithium					
E) bromine					
Dominie					
12) Which one of the	followin				<b>a</b> :
12) Which one of the					12)
A) ZnCO3	B) CoS	(9)	Pb(NO3)2	D) Cu <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

1. From the list of molecules shown below circle all covalent compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)

 $K_2O$   $N_2O$   $Ca(NO_3)_2$   $XeI_4$  RbBr  $Li_2SO_4$ 

2. Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)

Al and F

a. charge on Al  $+\frac{1}{3}$  charge on F  $-\frac{1}{3}$  (4 pts, 2 pts each)

Svoy #  $-\frac{1}{3}$   $-\frac{1}{3}$ 

b. correct formula is  $\frac{1}{2}$  (4 pts)

(+5) Al + (-1) + -0

Nomenclature (4 pts, 2 pts each)

- a. **hexa** is the number prefix for the number Q
- b Given the following formula of the polyatomic ions, give the name of the polyatomic ion:

NO3 \_ Nitrate

4. For the molecule  $CO_2$  (with molar mass = 44.01 g/mol), how many moles is 17.99 grams of the compound? (show work) (5 pts)

17.99g x melCon = 0.4088 mol CO2 CO2

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Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)

b. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (4 pts)

25,40, 20 25, 69

- 6. (a). Is the compound BaCO<sub>3</sub> [(soluble) of (insoluble)] (circle one) in water? (2 pt)
- (b) Write out the molecular form of the following precipitation reaction giving the expected products by (1) filling in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not need to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)

 $Ba(NO_3)_2 + Na_2CO_3 \rightarrow \underbrace{b_C CO_2}_{f}$  (s) or (aq)] circle one +  $\underbrace{Na_2NO_2}_{f}$  [(s) or (aq)] circle one

<u>Part III.</u> <u>Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the NH<sub>3</sub> in moles if you start with 58.7 moles of NO (g). Show work. (7 pts)

 $2NO(g) + 5 H_2(g) \rightarrow 2 NH_3(g) + 2 H_2O(g)$ 

S87 mil x 2 mil 1 58.7 mol NOG) 2 mil NOG

b. If the formula mass of NH<sub>3</sub> is 17.04 g/mole, what is the theoretical yield in grams [based on the number of moles of NH<sub>3</sub> from part (a)]? Show work. (6 pts)

58.7 mul NH<sub>3</sub> x 17.04 g/Mh<sub>3</sub> | 1000. 2

78.7 mul NH<sub>3</sub> x 17.04 g/Mh<sub>3</sub> | 1000 | 2

78.7 mul NH<sub>3</sub> x 17.04 g/Mh<sub>3</sub> | 1000 | 2

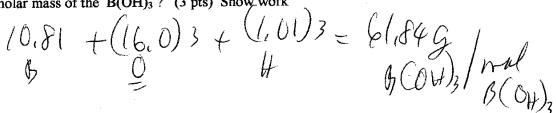
78.7 mul NH<sub>3</sub> x 17.04 g/Mh<sub>3</sub> | 1000 | 2

78.7 mul NH<sub>3</sub> | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1

[(NO) or  $(H_2)$ ] (circle one) (3 pts)

MO -> 58.7 mil Mys The -> 20.2 mil N Hz

- 2 If you dissolve 78.9 grams of B(OH)<sub>3</sub> in enough water to make up 788 mL of solution, what is the molarity of the solution? To answer this question, you are going to answer (a) through (d) (17 pts)
  - (a) What is the molar mass of the B(OH)<sub>3</sub>? (3 pts) Show-work



(b) How many moles of the B(OH)<sub>3</sub> do you have ? (5 pts) Show work.

$$18.99 b (04)_{3} \times \frac{\text{mal } b (04)_{3}}{61.849} = 1.28 \text{ mol} b (04)_{3}$$

(c) How many Liters of the solution do you have ? (4 pts) Show work.

(d) What is the molarity of the B(OH)<sub>3</sub> solution? (5 pts) Show work.

$$m = \frac{1.28 \text{ mol}}{9(04)_3} = \frac{1.62 \text{ m}}{504}.$$
 $504.$ 
 $\frac{9(04)_3}{188 \text{ me}} = \frac{1.62 \text{ m}}{1.62 \text{ m}}$ 
 $\frac{1.62 \text{ m}}{1.604)_3}$ 
 $\frac{1.62 \text{ m}}{1.604}$ 
 $\frac{1.62 \text{ m}}{1.604}$ 

Name			(print) Nan	ne			(sign)
Please sho hoice quo bviously xam and Part I M	ow work for partial estions have no par cannot grade it. (1 clearly tell me whe	credit and full credital credit. Please pts print and sign or the remaining and Choose the one a	it on the Long Are write anything yexam) If you resswer can be four	nswers and you want g in out of sp id.	l in some of raded legibl pace , please	the Short Answer y. If I cannot re continue on the	Questions. Multipead your work, I back page of the
	edit for MC. (2 pts j		pts total)				
1)	Determine the nam	_					1)
	A) nitrogen (IV)						
	B) nitrogen (II) (						
	C) nitrogen tetro D) dinitrogen pe						
	E) nitrogen diox						
2)	Which of the follow	ring exists as a diate	omic molecule?				2)
	A) carbon						
	B) lithium						
	C) phosphorus						
	D) hydrogen						
	E) krypton						
3)	Which of the follow	ing is an ionic com	pound?				3)
	A) Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>						
	B) SF <sub>2</sub>						
	C) PBr <sub>5</sub>						
	D) CH <sub>2</sub> O						
	E) Cl <sub>2</sub> O						
4)	Which one of the fo	llowing compound	s is insoluble in v	vater?	•		4)
	A) Ca Cl2	B) Pb Cl <sub>2</sub>	C	C) K2CO3		D) NaNO3	
5)	Which of the follow	ing solutions will h	ave the highest c	oncentratio	on of chlorid	le ions?	5)
	A) 0.10 M AlCl <sub>3</sub>	Ü	J				· · ·
	B) 0.10 M MgCl <sub>2</sub>						
	C) 0.05 M CaCl <sub>2</sub>						
	D) 0.10 M LiCl					•	
	E) All of these so	lutions have the sar	ne concentration	of chloride	e ions.		
6) '	What is the concent	ration of nitrate ion	s in a 0.125 M Mg	g(NOg)o so	olution?		6)
	A) 0.0625 M	B) 0.250 M	C) 0.125 M		) 0.160 M	E) 0.375 M	,
				•		•	
-	TT 1 0		_				
Dr.	Hahn General Che	mistry i Lecture	Exam II	Spring	2014	8:30 form A	page 1

7) Identify the compound with covalent bonds.								
A) Kr	B) KBr	C) Li	D) NaCl	E) CH <sub>4</sub>	7)			
<ol> <li>Determine the molecular formula of a compound that has a molar mass of 183.2 g/mol and an empirical formula of C<sub>2</sub>H<sub>5</sub>O<sub>2</sub>.</li> </ol>								
A) C <sub>8</sub> H <sub>20</sub> O <sub>8</sub>	B) C <sub>3</sub> H <sub>7</sub> O <sub>3</sub>	C) C <sub>2</sub> H <sub>5</sub> O <sub>2</sub>	D) C <sub>4</sub> H <sub>10</sub> O <sub>4</sub>	E) C <sub>6</sub> H <sub>15</sub> O <sub>6</sub>				
B) the transfer of C) the attraction	between 2 metal ato f electrons from one between 2 nonmeta that holds the atom	atom to another.	tomic ion.		9)			
10) Give the name for I	H <sub>2</sub> SO <sub>4</sub> .				10)			
A) persulfuric ac B) hyposulfurou C) persulfurous a D) sulfurous acid E) sulfuric acid	s acid acid							
11) Calculate the molar	mass for Mg(ClO <sub>4</sub> )	2.			11)			
A) 123.76 g/mol B) 119.52 g/mol C) 247.52 g/mol D) 75.76 g/mol E) 223.21 g/mol								
12) Give a possible mole	ecular formula for C	3H5ClO.			12)			
A) $C_6H_{10}O_2$					·			
B) C <sub>5</sub> H <sub>10</sub> Cl <sub>2</sub> O <sub>2</sub>								
C) $C_6H_{10}CIO_2$								
D) C <sub>6</sub> H <sub>10</sub> Cl <sub>2</sub> O <sub>2</sub>								
E) C <sub>6</sub> H <sub>12</sub> Cl <sub>2</sub> O <sub>2</sub>	•							

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

me to	grade it, clearly indicate where I can find your work. (41 pts)
1.	From the list of molecules shown below circle all ionic compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)
MgCl <sub>2</sub>	C <sub>6</sub> H <sub>6</sub> NH <sub>4</sub> Br PCl <sub>5</sub> Na <sub>3</sub> PO <sub>4</sub> KNO <sub>3</sub>
2.	Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)
Ba	and Cl
a.	charge on Ba charge on Cl (4 pts, 2 pts each)
b.	correct formula is (4 pts)
3	Nomenclature (4 pts, 2 pts each)
a.	penta is the number prefix for the number
b Give	en the following formula of the polyatomic ions, give the name of the polyatomic ion:
NH4 <sup>+</sup>	
4	For the molecule Ba (NO <sub>2</sub> ) <sub>2</sub> (molar mass = $261.35$ g/mol), how many moles is $1782.2$ grams of the

4. For the molecule Ba  $(NO_3)_2$  (molar mass = 261.35 g/mol), how many moles is 1782.2 grams of the compound? (show work) (5 pts)

5 a. Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)
$Cr_2O_3(s) + \underline{\hspace{1cm}} Al(l) \rightarrow \underline{\hspace{1cm}} Cr(l) + Al_2O_3(s)$
b. Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit (4 pts)
6. (a). Is the compound PbCl <sub>2</sub> [(soluble) or (insoluble)] (circle one) in water? (2 pt)
(b) Write out the molecular form of the following precipitation reaction giving the expected products by (1 filling in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not need to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)
$Pb(NO_3)_2 + CaCl_2 \rightarrow$ [(s) or (aq)] circle one +[(s) or (aq)] circle one

<u>Part III. Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite
the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the  $K_2O$  in moles if you start with 27.8 moles of K (s). Show work. (7 pts)

 $4 \text{ K (s)} + O_2(g) \rightarrow 2 \text{ K}_2O(s)$ 

b. If the formula mass of  $K_2O$  is 94.20 g/mole, what is the theoretical yield in grams [based on the number of moles of  $K_2O$  from part (a)]? Show work. (6 pts)

c. Your yield of the is  $K_2O$  from the number of moles of K (s) is \_\_\_\_moles (1 pt) [from your calculated results from part (a)]. If your number of moles of the  $K_2O$  [from the number of moles of starting  $O_2$ ] is given to be 20.7 mol  $K_2O$ , which is the limiting reagent?

[(K) or  $(O_2)$ ] (circle one) (3 pts)

2.	Ho	ow many grams of Ba(OH) <sub>2</sub> do you have in 345 mL of a 1.00 M solution? (17 pts) To swer this question, complete the following.
	a.	Rewrite the 1.00 M in terms of moles in mL of solution (6 pts)
	b.	How many moles of Ba(OH) <sub>2</sub> do you have? (4 pts) Show work.
	C.	What is the formula mass of the Ba(OH) <sub>2</sub> ? (4 pts) Show work.
	d.	How many grams of the Ba(OH) <sub>2</sub> do you have in the 345 mL of solution? (3 pts) Show work.

Vame	(print) Name	(sign)
Multip vork,	show work for partial credit and full credit on the Long Answers and in some of the Short Answer Questle choice questions have no partial credit. Please write anything you want graded legibly. If I cannot I obviously cannot grade it. (1 pts print and sign exam) If you run out of space, please continue on the exam and clearly tell me where the remaining answer can be found.	ot read your
	MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the rtial credit for MC. (2 pts per question, 24 pts pts total)	question.
	1) Which one of the following compounds is insoluble in water?	1)
	A) NaNO3 B) K2CO3 C) Pb Cl2 D) Ca Cl2	•
	2) Determine the molecular formula of a compound that has a molar mass of 183.2 g/mol and an empirical formula of C <sub>2</sub> H <sub>5</sub> O <sub>2</sub> .	2)
	A) C <sub>3</sub> H <sub>7</sub> O <sub>3</sub> B) C <sub>8</sub> H <sub>20</sub> O <sub>8</sub> C) C <sub>2</sub> H <sub>5</sub> O <sub>2</sub> D) C <sub>6</sub> H <sub>15</sub> O <sub>6</sub> E) C <sub>4</sub> H <sub>10</sub> O <sub>4</sub>	
	3) Give the name for H2SO4.  A) persulfurous acid B) sulfuric acid	3)
	C) persulfuric acid D) sulfurous acid E) hyposulfurous acid	
	4) Determine the name for NO2.  A) nitrogen dioxide  B) nitrogen tetroxide  C) dinitrogen pentoxide  D) nitrogen (IV) oxide  E) nitrogen (II) oxide	4)
	5) Which of the following solutions will have the highest concentration of chloride ions?	5)
	A) 0.10 M LiCl B) 0.10 M MgCl <sub>2</sub> C) 0.05 M CaCl <sub>2</sub> D) 0.10 M AlCl <sub>3</sub> E) All of these solutions have the same concentration of chloride ions.	
	6) Calculate the molar mass for Mg(ClO <sub>4</sub> ) <sub>2</sub> . A) 223.21 g/mol B) 119.52 g/mol C) 247.52 g/mol D) 75.76 g/mol E) 123.76 g/mol	6)

7) Gi	ive a possible molecu	ılar formula for C3	H5ClO.			7)
	A) C <sub>6</sub> H <sub>12</sub> Cl <sub>2</sub> O <sub>2</sub>					
	B) C <sub>6</sub> H <sub>10</sub> O <sub>2</sub>					
	C) C <sub>6</sub> H <sub>10</sub> ClO <sub>2</sub>					
	D) C <sub>6</sub> H <sub>10</sub> Cl <sub>2</sub> O <sub>2</sub>					
	E) C <sub>5</sub> H <sub>10</sub> Cl <sub>2</sub> O <sub>2</sub>					
8) W	hich of the following	; exists as a diatom	ic molecule?			8)
	A) phosphorus					
	B) krypton					
	C) carbon					
	D) hydrogen E) lithium					
	e) maam					
9) A	n ionic bond is best d	lescribed as				9)
,	A) the attraction tha		together in a polya	tomic ion.		
	B) the attraction bet	ween 2 nonmetal	atoms.			
	C) the transfer of ele		tom to another.			
	D) the sharing of ele					
	E) the attraction bet	tween 2 metal ator	ns.			
10) W	hich of the following	g is an ionic compo	ound?			10)
	A) CH <sub>2</sub> O					
	B) Mg3(PO4)2					
	C) SF <sub>2</sub>					
	D) PBr <sub>5</sub>					
	E) Cl <sub>2</sub> O					
11) W	/hat is the concentrat	ion of nitrate ions	in a 0.125 M Mg(N	O3)2 solution?		11)
,	A) 0.250 M	B) 0.0625 M	C) 0.375 M	D) 0.160 M	E) 0.125 M	
12) Id	lentify the compound	d with covalent bo	nds.			12)
,	A) NaCl	B) Kr	C) Li	D) CH4	E) KBr	

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work. (41 pts)

me to g	grade it, clearly indicate where I can find your work. (41 pts)
1.	From the list of molecules shown below circle all covalent compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)
$MgCl_2$	C <sub>6</sub> H <sub>6</sub> NH <sub>4</sub> Br PCl <sub>5</sub> Na <sub>3</sub> PO <sub>4</sub> KNO <sub>3</sub>
2.	Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)
Na an	d O
a.	charge on Na charge on O (4 pts, 2 pts each)
b.	correct formula is(4 pts)
3	Nomenclature (4 pts, 2 pts each)
a.	octa is the number prefix for the number
b Give	n the following formula of the polyatomic ions, give the name of the polyatomic ion:
PO <sub>4</sub> -3	
4.	For the molecule Ba $(NO_3)_2$ (molar mass = 261.35 g/mol), how many moles is 82.2 grams of the

compound? (show work) (5 pts)

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5	a.	Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)
	_Sn(s) +	Cl <sub>2</sub> (g) → SnCl <sub>4</sub> (l)
b. balan		e show how many of each type of atom is in both sides of the equation after you complete reaction for full credit.(4 pts)
6. <b>(a</b> )	. Is the	e compound CaS [(soluble) or (insoluble)] (circle one) in water? (2 pt)
fillin	g in the	the molecular form of the following precipitation reaction giving the expected products by (1) blanks and then (2) circling either (s) or (aq) by each product. The reaction does not clanced. (8 pts, 3 pt each blank, 1 pt each circling)
CaS	+ <b>M</b> g	$gCl_2 \rightarrow $ [(s) or (aq)] circle one +[(s) or (aq)] circle one

Part III. Long Answer Please show work for full credit and to receive partial credit. (34 pts) \*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite the question with no change in anything.\*\*\*\* Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work a. For the reaction shown, what is the theoretical yield of the K<sub>2</sub>O in moles if you start with 47.7 moles of K (s). Show work. (7 pts)  $4 \text{ K (s)} + O_2(g) \rightarrow 2 \text{ K}_2O(s)$ b. If the formula mass of K<sub>2</sub>O is 94.20 g/mole, what is the theoretical yield in grams [based on the number of moles of K<sub>2</sub>O from part (a)]? Show work. (6 pts) Your yield of the is K<sub>2</sub>O from the number of moles of K (s) is your calculated results from part (a)]. If your number of moles of the K<sub>2</sub>O [from the number of moles of starting  $O_2$  is given to be 13.9 mol  $K_2O_2$ , which is the limiting reagent?  $[(K) \text{ or } (O_2)]$  (circle one) (3 pts)

	swer this question, complete the following.
a.	Rewrite the 2.55 M in terms of moles in mL of solution (6 pts)
b.	How many moles of (NH <sub>4</sub> ) <sub>2</sub> S do you have? (4 pts) Show work.
	What is the formula mass of the $(NH_4)_2S$ ? (4 pts) Show work.
C.	what is the formula mass of the (19114)25 ? (4 pts) Show work.
d.	How many grams of the (NH <sub>4</sub> ) <sub>2</sub> S do you have in the 15.7 mL of solution? (3 pts) Show
	work.

Exam	II General Chemistry I Lecture Sprin	g 2014 3/4/14 Tuesday form 9:55	5 A Dr. Hahn	Exam # 2-13
Vame_		(print) Name		(sign)
choice obviou exam a	show work for partial credit and full crequestions have no partial credit. Pleasely cannot grade it. (1 pts print and sign and clearly tell me where the remaining a	se write anything you want graded le exam) If you run out of space, panswer can be found.	legibly. If I cannot lease continue on the	read your work, I e back page of the
	MULTIPLE CHOICE. Choose the one credit for MC. (2 pts per question, 24 pt		e statement or answe	ers the question. No
	1) What is the molar concentration of so A) 0.450 M B) 0.150		lution? D) 1.35 M	1)
	<ul> <li>2) Give the name for Na<sub>2</sub>SO<sub>4</sub>.</li> <li>A) sodium hydrogen sulfite</li> <li>B) sodium sulfide</li> <li>C) sodium hydrogen sulfate</li> <li>D) sodium sulfate</li> <li>E) sodium sulfite</li> </ul>			2)
	<ul> <li>3) Which of the following exists as a dia</li> <li>A) phosphorus</li> <li>B) bromine</li> <li>C) carbon</li> <li>D) krypton</li> <li>E) lithium</li> </ul>	itomic molecule?		3)
	4) Which of the following solutions will A) 0.40 M CaCl <sub>2</sub> B) 0.40 M MgCl <sub>2</sub> C) 0.60 M AlCl <sub>3</sub> D) 0.20 M LiCl E) All of these solutions have the s	have the highest concentration of concentration of concentration of chloride ions.		4)
	5) What is the empirical formula for Hg A) Hg <sub>2</sub> NO <sub>3</sub> B) HgNO <sub>3</sub> C) Hg <sub>4</sub> (NO <sub>3</sub> ) <sub>4</sub> D) Hg <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> E) Hg(NO <sub>3</sub> ) <sub>2</sub>			5)
	6) Which one of the following compoun A) Pb(NO3)2 B) CoS	nds is soluble in water? C) ZnCO3	D) Cu3(PO4)	6)2

<ol><li>Determine the m empirical formul</li></ol>	olecular formula of a a of NO2.	compound that has	a molar mass of 92.0	g/mol and an	7)
A) NO <sub>2</sub>	B) N <sub>3</sub> O <sub>6</sub>	C) N <sub>2</sub> O <sub>3</sub>	D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>5</sub>	
8) Give the name fo	r HNO3.				8)
A) hydrogen n	itrate				
B) nitric acid C) hydrogen n	itrite				
D) hydrogen n					
E) nitrous acid	l				
9) A covalent bond					9)
A) the transfer		. •			
	veen a metal and a no of electrons between				
_	veen two polyatomic				
E) a bond betv	veen a metal and a po	olyatomic ion.			
10) Which of the follo	owing is a covalent co	ompound?			10)
A) SrCl <sub>2</sub>	B) P <sub>4</sub> O <sub>10</sub>	C) LiCN	D) ZnS	E) LiOH	,
11) Identify the comp	oound with ionic bon	ds.			11)
A) KBr	B) CO	C) Ne	D) N <sub>2</sub>	E) H <sub>2</sub> O	
12) Calculate the mol	lar mass of Al(C <sub>2</sub> H <sub>3</sub> (	O <sub>2</sub> ) <sub>3</sub> .			12)
A) 139.99 g/mo					<del></del>
B) 204.13 g/mc					
C) 56.00 g/mol D) 258.09 g/mo					
E) 86.03 g/mol					

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answers the question. Some questions may require that you show work. If you do not show work, you may lose points. Even on questions which do not require work, if you legibly show work, you may get some partial credit.

Please show all work on this exam itself.     If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work.    (41   pts )
1. From the list of molecules shown below circle all ionic compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)
$K_2O$ $N_2O$ $Ca(NO_3)_2$ $XeI_4$ $RbBr$ $Li_2SO_4$
2. Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)
Li and N
a. charge on Li charge on N (4 pts, 2 pts each)
b. correct formula is(4 pts)
3 Nomenclature (4 pts, 2 pts each)
a. tri is the number prefix for the number
b Given the following formula of the polyatomic ions, give the name of the polyatomic ion:
CH <sub>3</sub> COO (also can be written C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> )
4. For the molecule $CO_2$ (with molar mass = 44.01 g/mol), how many moles is 24.77 grams of the compound? (show work) (5 pts)

5	a.	Balance the	following re	eaction by	filling in th	e blanks.	(4 pts, 2 pt	s per blank)
2 N <sub>2</sub> (g	) +	O <sub>2</sub>	(g) →		N <sub>2</sub> O(g)			
b.	Please balanc	show how ning the react	nany of each ion for full c	type of a redit.(4 p	tom is in bot ts)	h sides o	f the equation	on after you complete
				•				
6. (a).	Is the	compound	Na <sub>2</sub> SO <sub>4</sub>	[(solub	ole) or (insol	uble)] (ci	rcle one) in	water? (2 pt)
					• •	,•	o o totto o o oto	a semanted meadwate by (1)
filling	in the	blanks and	ar form of the then (2) cir pts, 3 pt each	cling eith	ier (s) or (ac	q) by eac	on giving th <b>h product</b> .	e expected products by (1)  The reaction does not
NaCl	+ Ag	<sub>2</sub> SO₄ →	[(	(s) or (aq)	] circle one	+		[(s) or (aq)] circle one

Part III. Long Answer Please show work for full credit and to receive partial credit. (34 pts)

\*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the NH<sub>3</sub> in moles if you start with 88.78 moles of NO (g). Show work. (7 pts)

 $2NO(g) + 5 H_2(g) \rightarrow 2 NH_3(g) + 2 H_2O(g)$ 

b. If the formula mass of NH<sub>3</sub> is 17.04 g/mole, what is the theoretical yield in grams [based on the number of moles of NH<sub>3</sub> from part (a)]? Show work. (6 pts)

c. Your yield of the  $NH_3$  from the number of moles of NO(g) is \_\_\_\_\_moles (1 pt) [from your calculated results from part (a)]. If your number of moles of the  $NH_3$  [from the number of moles of starting  $H_2$ ] is given to be 70.2 mol  $NH_3$ , which is the limiting reagent?

[(NO) or  $(H_2)$ ] (circle one) (3 pts)

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- If you dissolve 78.9 grams of  $Mg(NO_3)_2$  in enough water to make up 225 mL of solution, what is the molarity of the solution? To answer this question, complete the following. (17 pts)
  - a. What is the molar mass of the Mg(NO<sub>3</sub>)<sub>2</sub> ? (3 pts) Show work

b. How many moles of the Mg(NO<sub>3</sub>)<sub>2</sub> do you have ? (5 pts) Show work.

c. How many Liters of the solution do you have ? (4 pts) Show work.

d. What is the molarity of the Mg(NO<sub>3</sub>)<sub>2</sub> solution? (5 pts) Show work.

ne_			(print) Name_			(sign)
ce q	how work for partial c uestions have no parti ly cannot grade it. (1 p nd clearly tell me wher	al credit. Pleas pts print and sign	e write anything you exam) If you run	ı want graded legibly.	. If I cannot read	your work, I
	MULTIPLE CHOICE. credit for MC. (2 pts p			t completes the states	nent or answers th	e question. N
	1) Which of the follow A) LiOH	ing is a covalent of B) ZnS	compound? C) LiCN	D) P <sub>4</sub> O <sub>10</sub>	E) SrCl <sub>2</sub>	1)
	2) Which of the follow A) 0.60 M AlCl <sub>3</sub> B) 0.40 M CaCl <sub>2</sub> C) 0.40 M MgCl <sub>2</sub> D) 0.20 M LiCl E) All of these so		have the highest con		e ions?	2)
	3) What is the empiric A) Hg2NO3 B) Hg4(NO3)4 C) HgNO3 D) Hg2(NO3)2 E) Hg(NO3)2	al formula for Hg	<sub>22</sub> (NO <sub>3</sub> ) <sub>2</sub> ?			3)
	4) Identify the compor A) Ne	und with ionic bo B) CO	nds. C) N <sub>2</sub>	D) H <sub>2</sub> O	E) KBr	4)
	5) A covalent bond is A) a bond betwee B) a bond betwee C) the sharing of D) the transfer of E) a bond betwee	en a metal and a pen a metal and a pen a metal and a relectrons between	nonmetal. n atoms.			5)
	6) Determine the nam A) nitrogen tetro B) nitrogen diox C) dinitrogen per D) nitrogen (II) o E) nitrogen (IV)	xide ide ntoxide xide				6)
	7) What is the molar of A) 0.450 M	oncentration of so B) 0.150		) M Na3PO4 solution? 1.35 M	D) 1.80 M	7)

43.06.00 ( 1		O <sub>2</sub> ) <sub>3</sub> .			8)
A) 86.03 g/mol					
B) 204.13 g/mol	1				
C) 258.09 g/mol	1				
D) 56.00 g/mol					
E) 139.99 g/mol	<b>l</b> .	·			
9) Give the name for	HNO <sub>3</sub> .	•			9)
A) nitric acid					
B) hydrogen ni	tride				
C) hydrogen nii	trite				
D) nitrous acid					
E) hydrogen nit	trate				
10) Determine the mo		compound that has a	a molar mass of 92	.0 g/mol and an	10)
empirical formula	of NO <sub>2</sub> .				
A) NO <sub>2</sub>					
11,1102	B) N <sub>2</sub> O <sub>5</sub>	C) N <sub>3</sub> O <sub>6</sub>	D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	
11) Which of the follo			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
, -			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
11) Which of the follow A) carbon B) krypton			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
11) Which of the follow A) carbon B) krypton C) phosphorus			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
11) Which of the follow A) carbon B) krypton C) phosphorus D) lithium			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
11) Which of the follow A) carbon B) krypton C) phosphorus			D) N <sub>2</sub> O <sub>4</sub>	E) N <sub>2</sub> O <sub>3</sub>	11)
11) Which of the follow A) carbon B) krypton C) phosphorus D) lithium	wing exists as a diat	omic molecule? Is is soluble in water?		E) N <sub>2</sub> O <sub>3</sub> D) Cu <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	11)

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answers the question. Some questions may require that you show work. If you do not show work, you may lose points. Even on questions which do not require work, if you legibly show work, you may get some partial credit.

Please me to	show all work on this exam itself. If you are going to show work on the scratch paper and want grade it, clearly indicate where I can find your work. (41 pts)
1.	From the list of molecules shown below circle all covalent compounds. I am asking you to circle (or to not circle) the entire compound not parts of a compound formula. (6 pts, 1 pt each)
K₂O	N <sub>2</sub> O Ca(NO <sub>3</sub> ) <sub>2</sub> XeI <sub>4</sub> RbBr Li <sub>2</sub> SO <sub>4</sub>
2.	Write the correct ionic formula for the following elements. If you show work you may earn some partial credit on part (a). You must show work for part (b) (8 pts total)
Al ar	nd F
a.	charge on Al (4 pts, 2 pts each)
b.	correct formula is(4 pts)
3	Nomenclature (4 pts, 2 pts each)
a.	hexa is the number prefix for the number
b	Given the following formula of the polyatomic ions, give the name of the polyatomic ion:
NO <sub>3</sub>	
4.	For the molecule $CO_2$ (with molar mass = 44.01 g/mol), how many moles is 17.99 grams of the ound? (show work) (5 pts)

5	a. Balance the following reaction by filling in the blanks. (4 pts, 2 pts per blank)
2 SO <sub>2</sub>	(g) + $O_2(g) \rightarrow$ $SO_3(g)$
b.	Please show how many of each type of atom is in both sides of the equation after you complete balancing the reaction for full credit. (4 pts)
6. (a).	Is the compound BaCO <sub>3</sub> [(soluble) or (insoluble)] (circle one) in water? (2 pt)
filling	rite out the molecular form of the following precipitation reaction giving the expected products by (1) g in the blanks and then (2) circling either (s) or (aq) by each product. The reaction does not to be balanced. (8 pts, 3 pt each blank, 1 pt each circling)
Ba(N	$O_3)_2 + Na_2CO_3 \rightarrow $ [(s) or (aq)] circle one + [(s) or (aq)] circle one

<u>Part III.</u> <u>Long Answer</u> Please <u>show work</u> for full credit and to receive partial credit. (34 pts) \*\*\*\* Please attempt every problem for partial credit. You will get no partial credit if you just rewrite the question with no change in anything.\*\*\*\*

Please show all work on this exam itself. If you are going to show work on the scratch paper and want me to grade it, clearly indicate where I can find your work

a. For the reaction shown, what is the theoretical yield of the NH<sub>3</sub> in moles if you start with 58.7 moles of NO (g). Show work. (7 pts)

 $2NO(g) + 5H_2(g) \rightarrow 2NH_3(g) + 2H_2O(g)$ 

b. If the formula mass of NH<sub>3</sub> is 17.04 g/mole, what is the theoretical yield in grams [based on the number of moles of NH<sub>3</sub> from part (a)]? Show work. (6 pts)

c. Your yield of the  $NH_3$  from the number of moles of NO(g) is \_\_\_\_\_moles (1 pt) [from your calculated results from part (a)]. If your number of moles of the  $NH_3$  [from the number of moles of starting  $H_2$ ] is given to be 70.2 mol  $NH_3$ , which is the limiting reagent?

[(NO) or (H<sub>2</sub>)] (circle one) (3 pts)

- 2 If you dissolve 78.9 grams of B(OH)<sub>3</sub> in enough water to make up 788 mL of solution, what is the molarity of the solution? To answer this question, you are going to answer (a) through (d) (17 pts)
  - (a) What is the molar mass of the B(OH)<sub>3</sub>? (3 pts) Show work
  - (b) How many moles of the B(OH)3 do you have ? (5 pts) Show work.

(c) How many Liters of the solution do you have? (4 pts) Show work.

(d) What is the molarity of the B(OH)<sub>3</sub> solution? (5 pts) Show work.