	7	(print) Name	(sign)
stions have no p not grade it. (1	partial credit. Please w	ong Answers and in some of the Short An write anything you want graded legibly. It 7 page Exam, 5 page exam + periodic to m)	I cannot read your work, I obviously
l MULTIPLI per question, 2		one alternative that best completes the s	tatement or answers the question.
g N2O4	and 45.0 g N ₂ H ₄ . Some	LR) and the mass (in g) of nitrogen that capossibly useful molar masses are as follow $N_2 = 28.02g$ N	7s: $N_2O_4 = 92.02 \text{ g/mol}$,
	N2O4(I) + 2 N2F	$H_4(1) \rightarrow 3 N_2(g) + 4 H_2O(g)$	2) 1,65 × 28.020 N
BLR	$R = N_2H_4$, 13.3 g N_2 form $R = N_2O_4$; 45.7 g N_2 form	ω and ω , ω	72,028 10 mm
D) LR	$R = N_2H_4$, 59.0 g N_2 formed $R = N_2H_4$, 59.0 g N_2 form $R = N_2O_4$, 105 g N_2 formed	ned 45,09 x ml	Nety x 3 mol Ne by
A) 25° B) 30° C) 0°C D) 0K	temperature and pressuct and 30.00 in Hg OK and 1 torr Hg C and 1.00 atm and 1.00 atm C and 1 mm Hg	rre at STP.	H4 2)
	ne the concentration of a $(1V_1 = M_2V_2)$	solution prepared by diluting 20.0 mL of	a 0.200 M NaCl to 250.0 3)
A) 0.1	60 M B) 0.0160	M $(20.00800 \mathrm{M}) (0.250 \mathrm{M})$	(0.0320 M)
B) we C) we D) stre	HCl. nelectrolyte eak electrolyte, strong acid eak electrolyte, weak acid ong electrolyte, weak acid ong electrolyte, strong ac	d I d	10m) = (250,00 G) (
5) Calculate (A) 64.		of 2.20 moles of gas occupying 3.50 L at 3.3 8.0 K C) 5.25 K	0 atm. 5) <u>H</u> D) 337 K
	PV= nrT T= PV Tr	= (3,30atm)(3,5) (2,20 mg) (0,	08206 later)
	Dr. I	Hahn Exam II 8:30 A page	

•		
	6) Which of the following compounds is <u>soluble</u> in water? A) BaSO ₄ 6)	D_
	B) MgCO3 C) PbCl2 D)CaS E) None of these compounds is soluble in water.	
	7) Convert 1.25 atm to mm Hg. 7)	<u>0</u>
	A) 1000 mm Hg B) 875 mm Hg C) 760 mm Hg D) 950 mm Hg E) 1520 mm Hg	
	8) How many H+ ions can the acid, H2SO4, donate per molecule? A) 3 B) 1 D) 0	
	9) What volume will 0.780 moles of He occupy at STP? (A) 17.5 L (B) 22.4 L (C) 43.7 atm (D) 15.6 L (E) 70.0 L	A C
	10) According to the following balanced reaction, how many moles of HNO3 are formed from 8.44 10) moles of NO2 if there is plenty of water present?	
	$3 \text{ NO}_2(g) + \text{H}_2\text{O}(l) \rightarrow 2 \text{ HNO}_3(aq) + \text{NO}(g)$ A) 25.3 moles HNO ₃ $0. 180 \text{ hel} \times \frac{22.4}{l}$	<u>L</u>
	B) 2.81 moles HNO3 Ø) 5.63 moles HNO3 D) 8.44 moles HNO3 E) 1.83 moles HNO3 WOZ	n
	11) A mixture of 0.220 moles CO, 0.350 moles H ₂ and 0.640 moles He has a total pressure of 2.95 atm. 11) What is the pressure of H ₂ ? $N\tau = 0$, $220 + 0$, $350 + 0$, 640 A) 1.17 atm (B) 0.853 atm C) 0.649 atm D) 0.969 atm E) 1.03 atm	<u>U</u>
	12) Which of the following solutions will have the highest concentration of chloride ions? (A) 0.10 M AlCl3	A 1,350 n _T
	13) How many moles of NaCl are required to make 250 mL of a 3.00 M solution? A) 3 moles B) 750 moles C) 0.250 moles D) 0.750 moles	<u>D</u>
	$250 \text{ ml} \times \frac{3.00 \text{ mol}}{1000 \text{ nl}} = 0.15 \text{ mol}$	
	Dr. Hahn Exam II 8:30 A page 2	

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answer the question. (43 pts)

14) 1. To calculate mass percent of oxygen in NO₂ the formula is (8 pts total, 4 pt s top, 4 pts bottom)

mass % = (a) 14.0 g (b) 2×14.0 g (c) 2×1.01 g (d) $[(2 \times 16.0) + 14.0]$ g (circle one letter) $\times 100$ (a) 16.0 g (b) 2×14.0 g (c) 2×16.0 g (d) $[(2 \times 16.0) + 14.0]$ g (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

molarity (M) = $\frac{\# Moles \text{ of solute}}{\# LiGer} \text{ of solution}$

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

PbS(s) + 2HBr (aq) ----> 1PbBr₂(s) + H₂S(g)

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of N in N₂
- b. What is the oxidation state of elemental Na _____O__
- c. What is the oxidation state of nitrogen in NH3 Show work below by filling in the following blanks.

oxidation state of H is $\frac{+1}{}$ charge on NH3 is $\frac{0}{}$ oxidation state of N is $\frac{-3}{}$ 3(+1) + N = 0 N = -3

Pb
$$(NO_3)_2 + Ca (OH)_2 \longrightarrow Pb (OH)_2 (s) + Ca (NO_3)_2 (aq)$$

a Give the complete ionic equation for the precipitation molecular equation above by filling in the blanks

$$Pb^{+2}(aq) + 2 NO_3^{-1}(aq) + CA^{+2} + 2 OH^{-1}(aq) -> Pb(01)_2(s) + Ca^{+2}(aq) + 2 NO_3^{-1}(aq)$$

b. Give the net ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$Pb^{+2} (aq) + 2 O (aq) ---> Pb (OH)_2 (s)$$

$$2 \text{ H Cl} + \text{ Ca (OH)}_2 ---- CaCl}_2 + 2 \text{ H}_2\text{C}_2$$

a For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 12.7 grams of H Cl (molar mass HCl = 36.51 g HCl/mol HCl) how many grams of Ca Cl₂ (molar mass of Ca Cl₂ = 111.08 g CaCl₂ / mol Ca Cl₂) would you get? (15 pts, show work)

12.79 × maltill × Inallalls × 111.089 Calls Hell 36.519 × 2 maltill Inallalls Hell 19.39 Calls

b. For the above balanced chemical reaction, if you have 83.7 mL of 0.25 M of H Cl, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts)

83,7 ml × 0.25 mol HQ x 2 mol 40 = 0.0209 HU 1000 ml 2 mol mel roln HU soln HU 1420

Name	II General Chemistry I		(print) Name			(sign)
questi canno	show work for partial cr ons have no partial credit t grade it. (1 pts print and ke sure you have the ent	t. Please write an d sign exam) 7 page	ything you want gra-	ded legibly. If I	cannot read your wo	rk, I obviously
	MULTIPLE CHOICE. er question, 26 pts total)	Choose the one all	ternative that best co	ompletes the sta	tement or answers th	ne question. (2
	1) According to the foll moles of NO2 if ther			les of HNO3 are	formed from 8.44	1)
	3 N	$O_2(g) + H_2O(l) \rightarrow 2$	$HNO_3(aq) + NO(g)$			
	A) 25.3 moles HN B) 2.81 moles HN C) 1.83 moles HN	103 8.44 103 mole 103 NO2	× 2 mol 1 3 mol Nor	+NO3 =	5.63 HN03	
	D) 8.44 moles HN	Ю3	NOZ			1151
	(E))5.63 moles HN	103	_	0,7802	$d \times \frac{22.40}{1 \text{ mal}}$	==11,5
	2) What volume will 0. A) 70.0 L	780 moles of He occ B) 43.7 atm	cupy at STP? C) 22.4 L	D) 17.5 L	E) 15.6 L	2)
	3) Determine the concern mL. (M ₁ V ₁ = M ₂ V		on prepared by diluti	mg 20.0 mL of a (M) = (250)	0.200 M NaCl to 250.0 0.0 ml (?) EV 0.0160 M	$\stackrel{3)}{\Longrightarrow} (20.0)(0.20.0)$
	A) 0.00800 M	B) 0.0320 M	C) 2.50 M	D) 0.160 M	(H) 0.0160 M	250,0
	4) How many moles of A) 3 moles	NaCl are required	oles) moles	D) 0.250 moles	4) 5 .750 C
	5) Convert 1.25 atm to A) 760 mm Hg B) 1520 mm Hg C) 875 mm Hg D) 1000 mm Hg (E) 950 mm Hg		$\times \frac{760 \mathrm{m}}{1 \mathrm{ah}}$	$M \times \frac{3.0}{10}$ $= 95$	*******	5)
	6) A mixture of 0.220 r What is the pressure A) 0.969 atm	/ \	les H ₂ and 0.640 mol	res He has a total PA P(D))0.853 atn		6)
	What is the pressure A) 0.969 atm	e of H ₂ ? $\left\langle \right\rangle$	$A = \frac{1}{1.03}$ atm	- PA)		· · · · · · · · · · · · · · · · · · ·

				C
7) Determine the limiti	ng reactant (LR) a	nd the mass (in g) of nitroge	n that can be formed from	50.0 7)
g N2O4 and 45.0 g N	I ₂ H ₄ . Some possi	bly useful molar masses are	as follows: $N_2O_4 = 92.02$	g/mol,
$N_2H_4 = 32.05 \text{ g/mol}$	· (Inal)	$V_2 = 28,025$	NZ)	
	(11100	2 00,000	,	(45.19
N ₂ ($O_4(I) + 2 N_2 H_4(I)$	\rightarrow 3 N ₂ (g) + 4 H ₂ O(g)	204 2 11	
			14 mal	$\frac{1}{2}$ 28,029 $\frac{N_2}{2}$
A) $LR = N_2O_4$, 10	15 g N2 formed	50.0g x -m	X	= = = = = = = = = = = = = = = = = = = =
B) $LR = N_2H_4$, 59	0.0 g N2 formed	N204 92	OLG MACIO	204 pm M2
(C) LR = N ₂ O ₄ , 45	i.7 g N2 formed	/	1206	4
D) No LR, 45.0 g l	N ₂ formed	49,09 mil	Nelth 3 mal	N2 2802aM2
E) $LR = N_2H_4$, 13	3.3 g N2 formed	$\frac{1}{2}$	050 X	-× = 100
,		N244 32	100 y 2 hall	, holle
8) Calculate the tempe	rature, in K. of 2.2	0 moles of gas occupying 3.5	0 L at 3.30 atm.	4 8) <u>()</u>
, A) 5.25 K	B) 28.0 K		(D) 64.0 K	(297 -> 64 B
DV=nRT	T = PV	nR > (3.3)	Odba) (3,501)	= 63.17
9) Which of the following	ing solutions will l	nave the highest concentration	on of chloride ions?	(1) 9)
A) 0.05 M CaCl ₂	0,09 x2	⇒ 0·10 (2.20mol) (0,0)	9206)
B) 0.10 M MgCl ₂	0.10 X 2	= 0,20		596
C) 0.10 M NaCl	0,10) 1.0g
(D) 0.10 M AICl ₃	0.1083=	0.70		ū
E) All of these sol	lutions have the sa	ame concentration of chlorid	e ions.	_
				Ω
10) Which of the following	ing compounds is	soluble in water?		10) 17
A) BaSO ₄		è		
(B) CaS				
Č) MgCO3				
D) PbCl ₂				
E) None of these	compounds is sol	uble in water.		
11) Identify HCl.				11)
A) weak electroly				
B) nonelectrolyte C) weak electroly				
D strong electrol				
E) strong electrol	yte, weak acid			
-7 8	<i>,</i>			N
12) Give the temperatur	re and pressure at	STP.		12)
A) 0°C and 1 mm				
B) 0K and 1.00 at				
C) 25°C and 30.0				
D) 0°C and 1.00 a				
E) 300K and 1 to	11 178			\bigwedge
13) How many H+ ions	can the acid Hos	O4 , donate per molecule?		13)
(A) 2	B) 1	C) 3	D) 0	/
1.73.6.4	<i>U L</i>	٠, ٥	-,-	

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answer the question. (43 pts.)

14) 1. To calculate mass percent of oxygen in SO₂ the formula is (8 pts total, 4 pt s top, 4 pts bottom)

mass % = (a) 16.0 g (b) $2 \times 16.0 \text{ g}$ (c) $2 \times 32.0 \text{ g}$ (d) $[(2 \times 16.0) + 32.0]$ g (circle one letter oxygen (a) 16.0 g (b) $2 \times 16.0 \text{ g}$ (c) $2 \times 32.0 \text{ g}$ (d) $[(2 \times 16.0) + 32.0]$ g (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

 $CO(g) + 2 H_2(g) ----> CH_4(g) + H_2O(l)$

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of H in H₂
- b. What is the oxidation state of elemental Li
- c. What is the oxidation state of nitrogen in NO₃ (any charges may have been left off so that you can answer the question below) Show work below by filling in the following blanks.

oxidation state of O is -2 charge on NO₃ is -1oxidation state of N is +5 · N+3(-2)=-1 N = -1 + 6 = +5

Dr. Hahn Exam II 8:30 B page 3

$$2 K I (aq) + Ag _{2} SO_{4} (aq) ---> K_{2} SO_{4} (aq) + 2 Ag I (s)$$

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 K^{+1} + 2 I^{-1}(aq) + 2 Ag^{+1} + \frac{\sqrt{2}}{2}(aq) -> 2 K^{+1} + SO_4^{-2}(aq) + 2 Ag^{-1}(s)$$

b. Give the net ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 \text{ Ag}^{+1}(aq) + 2 \underline{I}^{-}(aq) \longrightarrow 2 \text{ Ag I (s)}$$

$$2 H Br + Ba (OH)_2 ----> Ba Br_2 + 2 H_2O$$

a. For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 37.5 grams of H Br (molar mass HBr = 80.91 g HBr / mol HBr) how many grams of BaBr₂ (molar mass of BaBr₂ = 297.13 g

BaBr₂ / mol BaBr₂) would you get? (15 pts, show work)

37.5 g × hulltbr x 1 hullbabr x 297.13g HBr 20.91g x 2 mol HBr x 1 hollbabr x 1 mollbabr, 1 mollbabr,

b. For the above balanced chemical reaction, if you have 83.7 mL of 0.11 M of H Br, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts)

83.7 mex 0.11 mal HBr X 2ml/h0 = 9.21 x/0⁻³ 7010 HBr X 2ml HBr HBr

ameKez	<u> </u>	(print) Name		(sign)
uestions have no partial c	redit. Please write a t and sign exam) 7 pa	Answers and in some of the nything you want graded k ge Exam, 5 page exam + pe	egibly. If I cannot read ye	our work, I obviously
art I MULTIPLE CHOIC ts per question, 26 pts tot		ternative that best comple	tes the statement or answ	rers the question. (2
1) How many H+ i	ons can the acid, H2SC	04 , donate per molecule?		1)
A) 1	B) 0	<u></u> 2	D) 3	
2) Which of the foll A) (NH ₄) ₂ CO B) Hg ₂ I ₂ C) BaS D) MgSO ₄	owing compounds is <u>i</u> 3	nsoluble in water?		2)
	e compounds are solub	le in water.		Δ.
750.0 mL of solu (A) 1.50 M	tion. (molar mass of I	rmed by dissolving 97.7 g I iBr = 86.845 g LiBr/mol LiB C) 2.30 M D M = 97.79 /	r)	
4) Identify NaCl. (A) strong elec B) strong acid C) weak electi D) nonelectrol	rolyte	$h = \frac{97.797}{95}$	50,0 ml x 100	6.115 mg) (0.08.
E) weak acid	PV=	n RT	12 nRT=	O. Trata
5) What is the volu A) 565 L	me of 0.175 mol of O ₂ B) 0.766 L	at 7.78 atm and 415K? V C) 1.53 L)) 25.0 L E) 24.	5) B
	following balanced re Assume an excess of K	action, how many moles of O.	KOH will be formed from	n 5.44 6)
	4 KO(s) + 2 H ₂ O(l) →	4 KOH(s) + O ₂ (g)		
(A) 10.9 moles B) 2.72 moles C) 4.87 moles D) 16.7 moles	кон	med 4 mol 1	10 = 10). 88

D) 16.7 moles KOH E) 8.33 moles KOH

7) Determine the limiting reactant (LR) and the mass (in g) of nitrogen that can be formed from 50.0 N ₂ O ₄ and 45.0 g N ₂ H ₄ . Some possibly useful molar masses are as follows: N ₂ O ₄ = 92.02 g/mol N ₂ H ₄ = 32.05 g/mol. (\mathcal{N}_2 \mathcal{N}_2 \mathcal{N}_3 \mathcal{N}_4 $\mathcal{N}_$	
$N_2O_4(1) + 2 N_2H_4(1) \rightarrow 3 N_2(g) + 4 H_2O(g)$	
(A) LR = N ₂ O ₄ , 45.7 g N ₂ formed B) LR = N ₂ O ₄ , 105 g N ₂ formed C) No LR 45.0 g N ₂ formed $\frac{3}{4}$ formed $\frac{3}{4}$ formed $\frac{3}{4}$ formed $\frac{3}{4}$ formed	$- \times \frac{28.02g}{1 \text{ mel}}$
DIP NILL FOR ALL SAME 45 DOS 12 10 10 A/A/A	
D) LR = N2H4, 59.0 g N2 formed 45 00 × MIL 1/2 1+4 × 3 hal N2	28,02gN2
D) LR = N ₂ H ₄ , 59.0 g N ₂ formed 45.0 g × $\frac{Ml N_2 H_4}{32.059}$ × $\frac{3 h d N_2}{2 h d N_2 H_4}$ × $\frac{3 h d N_2}{2 h d N_2 H_4}$	1 10 1/01
N 1 44 2 144	1 146/12
8) A mixture of 0.220 moles CO, 0.350 moles H ₂ and 0.640 moles He has a total pressure of 2.95 atm	. 8)
What is the pressure of CO?	<i>(</i>)
(A) 0.536 atm B) 0.955 atm C) 0.649 atm D) 1.86 atm E) 1.54 atm	1
M7=0,220+0.350+0.640=	\mathcal{O}
9) Which of the following solutions will have the highest concentration of chloride ions?	9)
1) 0 0 T 1 C C C C C C C C C C C C C C C C C C	1/2
A) 0.05 M CaCl ₂ 0,09 × 2 B) 0.10 M NaCl 0,10	4(0) = -
(C) 0.10 M AICI3 0.10 K 3	2,9500
E) All of these solutions have the same concentration of chloride ions.	
E) All of these solutions have the same concentration of chloride lons.	iA
10) Determine the concentration of a solution prepared by diluting 20.0 mL of a 0.200 M NaCl to 250. mL. $(M_1V_1 = M_2V_2)$	0 10)
A) 0.0320 M B) 2.50 M C) 0.00800 M D) 0.0160 M E) 0.160 M	
	h
11) Give the temperature and pressure at STP.	· · · · · · · · · · · · · · · · · · ·
11) Give the temperature and pressure at STP. (A) 0°C and 1.00 atm (B) 0K and 1.00 atm (C) 0.0 ml (0.200 m) = (25)	00.017 mt
B) 0K and 1.00 atm	(1/2)
C) 300K and 1 torr Hg	
D) 25°C and 30.00 in Hg	
E) 0°C and 1 mm Hg	
	n
12) What volume will 0.780 moles of He occupy at STP?	12)
(A) 17.5 L B) 22.4 L C) 70.0 L D) 15.6 L E) 43.7 atm	
(A) 17.5 B	^
13) Convert 1.25 atm to mm Hg.	13)
13) Convert 1.25 atm to mm Hg. (A) 950 mm Hg B) 875 mm Hg (C) 760 mm Hg	10) -17
B) 875 mm Hg	
C) 760 mm Hg	
D) 1520 mm Hg	
E) 1000 mm Hg	
1,25 atr x 760 mm/g =	

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answer the question. (43 pts.)

14) 1. To calculate mass percent of sulfur in H2S the formula is (8 pts total, 4 pt s top, 4 pts bottom)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

 $\underline{\hspace{0.5cm}}$ $\underline{\hspace{0.5cm}}$

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of O in O₂
- b. What is the oxidation state of elemental Mg ______
- c. What is the oxidation state of nitrogen in NO_2 Show work below by filling in the following blanks.

oxidation state of O is $\frac{-2}{}$ charge on NO₂ is $\frac{0}{}$ oxidation state of N is $\frac{+4}{}$ $\mathcal{N} + 2(-2) = 0$

$$Li_2S(aq) + Pb(NO_3)_2(aq) \longrightarrow 2 LiNO_3(aq) + Pb S(s)$$

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 \operatorname{Li^{+1}(aq)} + \operatorname{S^{-2}(aq)} + \operatorname{Pb^{+2}(aq)} + 2 \underbrace{\sqrt{b} 7} (aq) -> 2 \operatorname{Li^{+1}(aq)} + 2 \operatorname{NO3^{-1}(aq)} + \underbrace{pb 5} (s)$$

b. Give the net ionic equation for the precipitation molecular equation above. by filling i the blanks.

$$Pb^{+2}(aq) + S^{-2}(aq) --> Ph$$
 (s)

 $H_2 SO_4 + 2 Na OH ---> Na_2 SO_4 + 2 H_2O$

a. For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 95.2 grams of NaOH (molar mass NaOH = 40.01 g NaOH / mol NaOH) how many grams of Na2SO4 (molar mass Na2SO4 = 142.1 g Na2SO4/mol Na2SO4) would you get? (15 pts, show work)

95.29 × hol NaOH × 1 mel Naz Soc × 142.19 Wall 40.019 × 2 mel 1 mel Nas Soc Nas Soc

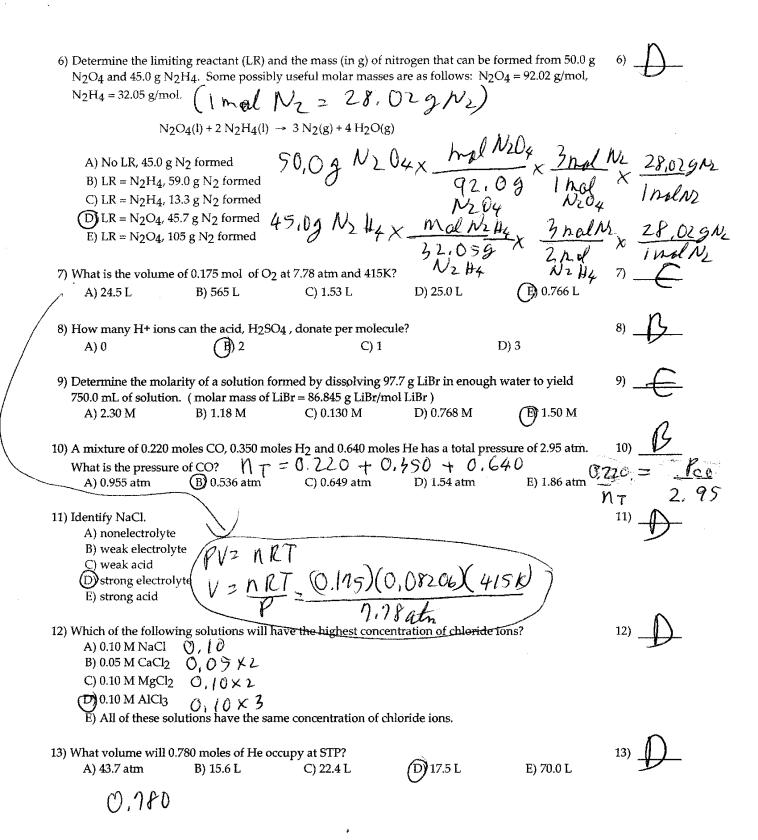
= 169g Nar 504

b. For the above balanced chemical reaction, if you have 83.7 mL of 1.5 M of Na OH, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts, show work)

83,7 m(x 1,5 hol NaOH x 2 mol ho NaUt 1000 ml NaOH 2 md NaOH

mol Ho

Exam I	General Chemistry I (CHEM	/I 101) 10/18/12 9:55 ar	n, T, R Dr. Hahn	form 955 B	Exam #	
Name_	_ Key	(print) N	vame			(sign)
questio cannot	whow work for partial credit or ns have no partial credit. Play grade it. (1 pts print and sign of make sure you have the enti	ease write anything you exam) 7 page Exam		bly. If I cannot i	read your work,	, I obviously
	MULTIPLE CHOICE. Choos question, 26 pts total)	e the one alternative th	at best completes	the statement of	r answers the q	uestion. (2
	1) Convert 1.25 atm to mm Hg (A) 950 mm Hg B) 1520 mm Hg C) 1000 mm Hg D) 760 mm Hg E) 875 mm Hg	25 atm x 1	160 mm Hz atm	¥ = ?		1)
	2) Which of the following com A) MgSO4 B) Hg2I2 C) (NH4)2CO3 D) BaS E) All of these compound		water?			2)
	3) Give the temperature and p A) 25°C and 30.00 in Hg B) 300K and 1 torr Hg C)0°C and 1.00 atm D) 0°C and 1 mm Hg E) 0K and 1.00 atm	ressure at STP.)(0,200,	n) = (25	0.0 ml)(3) <u>C</u>
	4) Determine the concentration mL. $(M_1V_1 = M_2V_2)$ A) 0.160 M B) 0	Λ	by diluting 20.0 n	nL of a 0.200 M N		4) 13
	5) According to the following moles of H ₂ O? Assume an		many moles of KC	OH will be forme	ed from 5.44	5)
	4 KO(s) + 2	$H_2O(l) \rightarrow 4 \text{ KOH(s)} +$	O ₂ (g)			
	A) 4.87 moles KOH B) 16.7 moles KOH C) 8.33 moles KOH D) 10.9 moles KOH E) 2.72 moles KOH	5.44 mol x 120	4 nol 4	kon =	7.	



Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answer the question. (43 pts.)

14) 1. To calculate mass percent of carbon in CH4 the formula is (8 pts total, 4 pt s top, 4 pts bottom)

mass % = (a)
$$12.0 \text{ g}$$
 (b) $2 \times 12.0 \text{ g}$ (c) $4 \times 1.01 \text{ g}$ (d) $[(4 \times 1.01) + 12.0]$ g (circle one letter x 100) (a) 12.0 g (b) $2 \times 12.0 \text{ g}$ (c) $4 \times 1.01 \text{ g}$ (d) $[(4 \times 1.01) + 12.0]$ g (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

$$2 \text{Cu(s)} + 1 \text{S(s)} \longrightarrow 2 \text{Cu}_2 \text{S(s)}$$

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of Cl in Cl₂
- b. What is the oxidation state of elemental Ca______
- c. What is the oxidation state of Sn in SnO₂ Show work below by filling in the following blanks.

oxidation state of O is
$$\frac{-2}{}$$
 charge on SnO₂ is $\frac{O}{}$ oxidation state of Sn is $\frac{+4}{}$ $\frac{5n}{} + 2(-2) = 0$

$$Na_2CO_3$$
 (aq) + Ca Cl_2 (aq) ----> 2 Na Cl (aq) + Ca CO_3 (s)

Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks

$$2 \text{ Na}^{+1}_{(aq)} + \text{CO}_3^{-2}(aq) + \text{Ca}^{+2}(aq) + 2 \text{Cl}^{-1}(aq) --> 2 \text{ Na}^{+1}(aq) + 2 \text{Cl}^{-1}(aq) + 2 \text{Cl}^{-1}(aq) + 2 \text{Cl}^{-1}(aq)$$
 (s)

Give the net ionic equation for the precipitation molecular equation above. by filling i b . the blanks.

$$C_{4}$$
 (aq) + CO₃-2(aq) ---> Ca CO₃ (s)

 $H_2SO_4 + 2 \text{ Li OH} \longrightarrow \text{Li } 2 SO_4 + 2 H_2O$

a. For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 14.7 grams of LiOH (molar mass LiOH = 23.95 g LiOH/mol LiOH) how many grams of Li2 SO4 (molar mass Li2SO4 = 109.98 g Li2SO4 / mol Li2SO4) would you get? (15 pts, show work)

14.79 x molliott x 1 hollissex x 109.989 Liott 23.959 2 mollion Impliasor

= 33,8 g Liz 504

b. For the above balanced chemical reaction, if you have 83.7 mL of 1.3 M of Li OH, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts, show work)

83,7 ml x 1.3 md x 2 md lho = 0.1088
Li DI+
70ln 1000 ml Li OH
Li OH

0.11 md
(w sig.fig)

1e			(print) Name			(sign)
itions l iot gra	nave no partial cre	dit. Please write a and sign exam) 7 p	inswers and in some nything you want gr age Exam, 5 page ex	aded legibly. If I ca	nnot read your work	ς, I obvious
	ULTIPLE CHOICE estion, 26 pts total		lternative that best (completes the state	ment or answers the	question.
		, N2H4. Some possil	nd the mass (in g) of oly useful molar mas			1)
٠	N	2O4(l) + 2 N2H4(l)	→ 3 N2(g) + 4 H2O(g	3)		
	A) $IR = N_0H_A$	13.3 g N ₂ formed				
		45.7 g N2 formed				
	C) No LR, 45.0	**				
		59.0 g N2 formed				
		105 g N ₂ formed			· ·	
2)	Give the temperat A) 25°C and 30. B) 300K and 1 t		STP.			2)
	C) 0°C and 1.00					
	D) 0K and 1.00					
	E) 0°C and 1 m	m Hg				
	Determine the con $M_1V_1 = M_2$		on prepared by dilut	ing 20.0 mL of a 0.2	00 M NaCl to 250.0	3)
	A) 0.160 M	B) 0.0160 M	C) 0.00800 M	D) 2.50 M	E) 0.0320 M	
4)	Identify HCl.					4)
-/	A) nonelectroly	te				
		lyte, strong acid	۵			
	C) weak electro	lyte, weak acid				
	D) strong electro					
	E) strong electro	olyte, strong acid				

6) Which of the followir	ng compounds is <u>so</u>	luble in water?			6)
A) BaSO ₄					
B) MgCO ₃					
C) PbCl ₂		·			
D) CaS					
	ompounds is solub	le in water.			
7) Convert 1.25 atm to r	nm Hg.				7)
A) 1000 mm Hg	<u> </u>				
B) 875 mm Hg				•	
C) 760 mm Hg					
D) 950 mm Hg					
E) 1520 mm Hg		*			
8) How many H+ ions o	an the acid, H2SO4	, donate per molec	ule?		8)
A) 3	B) 1	C) 2		D) 0	
9) What volume will 0.7	'80 moles of He occ	upy at STP?			9)
A) 17.5 L	B) 22.4 L	C) 43.7 atm	D) 15.6 L	E) 70.0 L	
		HNO3(aq) + NO(g)			
A) 25.3 moles HNO	D3				
B) 2.81 moles HNO	O ₃				
C) 5.63 moles HN0	Ο3				
D) 8.44 moles HNO	O3	٥			
E) 1.83 moles HNO	D3				
11) A mixture of 0.220 m		es H ₂ and 0.640 mol	es He has a total pr	essure of 2.95 atm.	11)
What is the pressure			•		
A) 1.17 atm	B) 0.853 atm	C) 0.649 atm	D) 0.969 atm	E) 1.03 atm	
12) Which of the followin A) 0.10 M AlCl3	g solutions will hav	ve the highest conce	ntration of chloride	ions?	12)
B) 0.10 M MgCl ₂					
C) 0.10 M NaCl					
D) 0.05 M CaCl ₂	., 1 .3				
E) All of these solu	itions have the sam	e concentration of c	nionde ions.		
13) How many moles of I	•				13)
A) 3 moles	B) 750 mole	s C) 0.2	50 moles	D) 0.750 moles	

		ss percent of oxygen i	n NO_2 the formula is (8 p	ts total, 4 pt s top, 4 pts
	bottom)	•		
ma ox	****) + 14.0] g (circle one letter x 100
γ	$\sqrt{(a) 16.0 g}$ ((b) 2 x 14.0 g (c) 2	2 x 16.0 g (d) [(2 x 16.0)+	14.0] g (circle one letter)
	2. The definition of	f molarity (M) is (8	pts, 4 pts top, 4 pts bott	om)
		#	of solute	
	molarity (M) =	#	of solution	
			ne balancing of the equation	
	coefficients out y	you leave the subscrip	ts alone. (9 ts, 3 pts eac	i Oldlik)
	PbS(s) + HI	Br (aq)>	$PbBr_2(s) + H_2S(g)$	
4.		Br (aq)>		
4. a.	Oxidation States:		er blank)	
	Oxidation States:	(10 pts total, 2 pts p	er blank)	
. ′	Oxidation States: What is the oxidation	(10 pts total, 2 pts p	er blank)	
a.	Oxidation States: What is the oxidation	(10 pts total, 2 pts p n state of N in N $_2$	er blank)	
a. b.	Oxidation States: What is the oxidation What is the oxidation	(10 pts total, 2 pts p n state of N in N ₂	er blank)	oy filling in the following
a. b.	Oxidation States: What is the oxidation What is the oxidation	(10 pts total, 2 pts p n state of N in N ₂	er blank)	oy filling in the following
a. b. c.	Oxidation States: What is the oxidation What is the oxidation What is the oxidation anks.	(10 pts total, 2 pts p n state of N in N ₂ _ on state of elemental n state of nitrogen in	er blank)	oy filling in the following
a. b.	Oxidation States: What is the oxidation What is the oxidation What is the oxidation anks.	(10 pts total, 2 pts p n state of N in N2 on state of elemental n state of nitrogen in is charg	er blank) Na NH3 Show work below b	oy filling in the following

5 For the following reacta	ints given the follo	owing balanced p	precipitation mole	ecular reactions
(9 pts total, 3 pts per blank)				

Pb
$$(NO_3)_2 + Ca (OH)_2$$
 ----> Pb $(OH)_2 (s) + Ca (NO_3)_2 (aq)$

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks .

$$Pb^{+2}$$
 (aq) + 2 NO₃-1 (aq) + ____ + 2 OH-1 (aq) --> ____ (s) + Ca⁺²(aq) + 2 NO₃-1 (aq)

b. Give the net ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$Pb^{+2}$$
 (aq) + 2 ____ (aq) ---> Pb (OH)₂ (s)

$$2 \text{ H Cl} + \text{Ca (OH)}_2 ----> \text{CaCl}_2 + 2 \text{ H}_2\text{O}$$

a For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 12.7 grams of H Cl (molar mass HCl = 36.51 g HCl/mol HCl) how many grams of Ca Cl₂ (molar mass of Ca Cl₂ = 111.08 g CaCl₂ / mol Ca Cl₂) would you get? (15 pts, show work)

b. For the above balanced chemical reaction, if you have 83.7 mL of 0.25 M of H Cl, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts)

Exam II	General Chemistry I (CHEM 101) 10/18/1	2 8:30 am T,R D	r. Hahn form 830 I	3 Exam # 3	-11
Name			_(print) Name			(sign)
Please sh	now work for partial cre is have no partial credit. rade it. (1 pts print and	dit on the Long Ans Please write any	wers and in some o	of the Short Answer (ded legibly. If I canr	Questions. Multip not read your work	t, I obviously
to make	sure you have the enti	re exam)				
	MULTIPLE CHOICE. (question, 26 pts total)	Choose the one alte	rnative that best c	ompletes the stateme	ent or answers the	question. (2
1	l) According to the follo moles of NO2 if there			oles of HNO3 are form	ned from 8.44	1)
	3 NC	$O_2(g) + H_2O(l) \rightarrow 2 I$	HNO3(aq) + NO(g)			
	A) 25.3 moles HN(D ₃				
	B) 2.81 moles HN0					
	C) 1.83 moles HNO					
	D) 8.44 moles HN(=				
	E) 5.63 moles HNO					
	2) What volume will 0.7				T) 4 F / I	2)
	A) 70.0 L	B) 43.7 atm	C) 22.4 L	D) 17.5 L	E) 15.6 L	
3	B) Determine the concermine ML . $(M_1V_1 = M_2V_2)$		ı prepared by diluti	ng 20.0 mL of a 0.200	M NaCl to 250.0	3)
	A) 0.00800 M	B) 0.0320 M	C) 2.50 M	D) 0.160 M	E) 0.0160 M	
4	4) How many moles of A) 3 moles	NaCl are required to B) 0.750 mol		3.00 M solution?) moles D) 0.250 moles	4)
						=)
	5) Convert 1.25 atm to r A) 760 mm Hg B) 1520 mm Hg C) 875 mm Hg D) 1000 mm Hg E) 950 mm Hg	nm Hg. both	,			5)
(6) A mixture of 0.220 m What is the pressure		s H2 and 0.640 mol	es He has a total pres	sure of 2.95 atm.	6)
	A) 0.969 atm	B) 0.649 atm	C) 1.03 atm	D) 0.853 atm	E) 1.17 atm	

g N20	Thine the limiting read 04 and $45.0 \text{ g N}_2\text{H}_4$. 9 9 9 9 9 9 9 9 9 9	tant (LR) and the r Some possibly usef	mass (in g) of nitrogen that ful molar masses are as fol	can be formed from 50.0 lows: $N_2O_4 = 92.02$ g/mol,	7)
	N ₂ O ₄ (l) + 2	$2 N_2 H_4(l) \rightarrow 3 N_2$	2(g) + 4 H ₂ O(g)		
A)	$LR = N_2O_4$, 105 g N_2	formed			
B)	$LR = N_2H_4$, 59.0 g N_2	formed			
C)	$LR = N_2O_4$, 45.7 g N_2	formed			
D)	No LR, 45.0 g N2 form	ned			
E)	$LR = N_2H_4$, 13.3 g N_2	o formed			
	ilate the temperature, 5.25 K	in K, of 2.20 moles B) 28.0 K	of gas occupying 3.50 L at C) 337 K	3.30 atm. D) 64.0 K	8)
	h of the following solu 0.05 M CaCl ₂	itions will have the	highest concentration of c	hloride ions?	9)
B)	0.10 M MgCl ₂				
C)	0.10 M NaCl				
D)	0.10 M AlCl ₃				
E)	All of these solutions	have the same con	centration of chloride ions		
	h of the following com BaSO4	npounds is <u>soluble</u>	in water?	•	10)
•	CaS				
	MgCO3				
•	PbCl ₂				
E)	None of these compor	unds is soluble in v	water.		
11) Iden					11)
	weak electrolyte, wea	k acid			
	nonelectrolyte weak electrolyte, strong	na said			
	strong electrolyte, stro				
	strong electrolyte, we				
12) Give	the temperature and p	oressure at STP.			12)
A)	0°C and 1 mm Hg				
	0K and 1.00 atm				
	25°C and 30.00 in Hg				
	0°C and 1.00 atm 300K and 1 torr Hg				
13) How	many H+ ions can the	e acid, H2SO4 , dor	nate per molecule?		13)
A)	2	B) 1	C) 3	D) 0	

Part II	Short Answer:	Write the word or phrase	or circle the choice that best c	ompletes each statement or answer the
questio	on. (43 pts)		•	

14) 1. To calculate mass percent of oxygen in SO₂ the formula is (8 pts total, 4 pt s top, 4 pts bottom)

mass % = (a) 16.0 g (b) $2 \times 16.0 \text{ g}$ (c) $2 \times 32.0 \text{ g}$ (d) $[(2 \times 16.0) + 32.0] \text{ g}$ (circle one letter oxygen (a) 16.0 g (b) $2 \times 16.0 \text{ g}$ (c) $2 \times 32.0 \text{ g}$ (d) $[(2 \times 16.0) + 32.0] \text{ g}$ (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

molarity (M) = # ______ of solute of solution

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

 $CO(g) + H_2(g) ----> CH_4(g) + H_2O(l)$

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of H in H₂
- b. What is the oxidation state of elemental Li
- c. What is the oxidation state of nitrogen in NO₃ (any charges may have been left off so that you can answer the question below) Show work below by filling in the following blanks.

oxidation state of N is _____ charge on NO₃ is _____ oxidation state of N is _____

$$2~K~I~(aq)~+~Ag~_2~SO_4~(aq)~--->~K_2~SO_4~(aq~)~+~2~Ag~I~(s)$$

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 K^{+1} + 2 I^{-1}(aq) + 2 Ag^{+1} +$$
 (aq) --> $2 K^{+1} + SO_4^{-2}(aq) + 2$ (s)

b. Give the net ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 \text{ Ag}^{+1}(aq) + 2 \underline{\hspace{1cm}} (aq) \qquad --> 2 \text{ Ag I (s)}$$

$$2 \text{ H Br} + \text{Ba} (\text{OH})_2 ----> \text{Ba Br}_2 + 2 \text{ H}_2\text{O}$$

a. For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 37.5 grams of H Br (molar mass HBr = 80.91 g HBr / mol HBr) how many grams of BaBr₂ (molar mass of BaBr₂ = 297.13 g BaBr₂ / mol BaBr₂) would you get? (15 pts, show work)

b. For the above balanced chemical reaction, if you have 83.7 mL of 0.11 M of H Br, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts)

Exam I	I General Chemistry I (CHEM 101) 10/1	8/12 9:55 am T,R D	r. Hahn form 95	5 A Exam # 2	<u>~//</u>
Name_			(print) Name			(sign)
questio cannot	show work for partial creons have no partial credit. grade it. (1 pts print and e sure you have the entime	Please write a sign exam) 7 p	anything you want gr	aded legibly. If I ca	nnot read your wo	rk, I obviously
	MULTIPLE CHOICE. (question, 26 pts total)	Choose the one a	lternative that best o	ompletes the staten	ient or answers the	question. (2
	1) How many H+ ions c	an the acid, H2S	O4 , donate per molec	ule?		1)
	A) 1	B) 0	C) 2		D) 3	
	2) Which of the followin A) (NH ₄) ₂ CO ₃	g compounds is	insoluble in water?			2)
	B) Hg ₂ I ₂ C) BaS D) MgSO ₄					
	E) All of these com	pounds are solu	ble in water.			
	3) Determine the molari 750.0 mL of solution.	(molar mass of	LiBr = 86.845 g LiBr/n	ol LiBr)		3)
	A) 1.50 M	B) 1.18 M	C) 2.30 M	D) 0.768 M	E) 0.130 M	
	4) Identify NaCl. A) strong electrolyte B) strong acid C) weak electrolyte D) nonelectrolyte E) weak acid					4)
	5) What is the volume of	f 0.175 mol of O ₂	2 at 7.78 atm and 415F	?		5)
	A) 565 L	B) 0.766 L	C) 1.53 L	D) 25.0 L	E) 24.5 L	
	6) According to the follomoles of H ₂ O? Assur			oles of KOH will be	formed from 5.44	6)
	4 KC	(s) + 2 H ₂ O(l) →	• 4 KOH(s) + O ₂ (g)			
	A) 10.9 moles KOH B) 2.72 moles KOH C) 4.87 moles KOH D) 16.7 moles KOH	[[[

7) Determine the limiting reactant (LR) and the mass (in g) of nitrogen that can be formed from 50.0 g N ₂ O ₄ and 45.0 g N ₂ H ₄ . Some possibly useful molar masses are as follows: N ₂ O ₄ = 92.02 g/mol ,					
$N_2H_4 = 32.05 \text{ g/mo}$	1.				
N ₂	$O_4(l) + 2 N_2 H_4(l) -$	→ 3 N ₂ (g) + 4 H ₂ O(g))		
A) $LR = N_2O_4$, 4	5.7 g N2 formed				
B) $LR = N_2O_4$, 10	05 g N ₂ formed				
C) No LR, 45.0 g					
D) $LR = N_2H_4$, 5	-				
E) $LR = N_2H_4$, 1					
8) A mixture of 0.220 r	noles CO, 0.350 mol	es H2 and 0.640 mole	es He has a total pres	sure of 2.95 atm.	8)
What is the pressure		<u> </u>	*		
A) 0.536 atm	B) 0.955 atm	C) 0.649 atm	D) 1.86 atm	E) 1.54 atm	
9) Which of the follow A) 0.05 M CaCl ₂	ing solutions will ha	eve the highest conce	ntration of chloride i	ons?	9)
B) 0.10 M NaCl					
C) 0.10 M AlCl ₃	٠.				
D) 0.10 M MgCl ₂					
E) All of these so	lutions have the san	ne concentration of ch	loride ions.		
10) Determine the conce mL . $(M_1V_1 = M_2V_1)$		on prepared by diluti	ng 20.0 mL of a 0.200	M NaCl to 250.0	10)
A) 0.0320 M	B) 2.50 M	C) 0.00800 M	D) 0.0160 M	E) 0.160 M	
11) Give the temperatur	re and pressure at S	ΓP.			11)
A) 0°C and 1.00 a					
B) 0K and 1.00 at				pr.	
C) 300K and 1 tor	_				
D) 25°C and 30.00					
E) 0°C and 1 mm	rig				
12) What volume will 0	.780 moles of He occ	rupy at STP?			12)
A) 17.5 L	B) 22.4 L	C) 70.0 L	D) 15.6 L	E) 43.7 atm	
13) Convert 1.25 atm to	mm Hg.				13)
A) 950 mm Hg	-				
B) 875 mm Hg		٥			
C) 760 mm Hg					
D) 1520 mm Hg					
E) 1000 mm Hg					

Part II Short Answer:	Write the word or phrase or circle the choice that best completes each statement or answer the
question. (43 pts)	

14)	1.	To calculate mass percent of sulfur in H2S	the formula is (8 pts total, 4 pt s top,	4 pts
		bottom)		

mass % = (a) 32.0 g (b) 2 x 16.0 g (c) 2 x 1.01 g (d) [(2 x 1.01) + 32.0] g (circle one letter) sulfur
$$x 100$$
 (a) 32.0 g (b) 2 x 16.0 g (c) 2 x 1.01 g (d) [(2 x 1.01) + 32.0] g (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of O in O₂
- b. What is the oxidation state of elemental Mg_____
- c. What is the oxidation state of nitrogen in NO_2 Show work below by filling in the following blanks.

```
oxidation state of O is _____ charge on NO<sub>2</sub> is _____
oxidation state of N is _____
```

$$Li_2S(aq) + Pb(NO_3)_2(aq) ----> 2 Li_NO_3(aq) + Pb_S(s)$$

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks.

$$2 \text{ Li}^{+1}(aq) + \text{S}^{-2}(aq) + \text{Pb}^{+2}(aq) + 2 \underline{\hspace{1cm}} (aq) --> 2 \text{ Li}^{+1}(aq) + 2 \text{ NO3}^{-1}(aq) + \underline{\hspace{1cm}} (s)$$

b. Give the net ionic equation for the precipitation molecular equation above. by filling i the blanks.

$$Pb^{+2}(aq) + S^{-2}(aq) -->$$
 _____ (s)

$$H_2 SO_4 + 2 Na OH ---> Na_2 SO_4 + 2 H_2O$$

a. For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 95.2 grams of NaOH (molar mass NaOH = 40.01 g NaOH / mol NaOH) how many grams of Na2SO4 (molar mass Na2SO4 = 142.1 g Na2SO4/mol Na2SO4) would you get? (15 pts, show work)

b. For the above balanced chemical reaction, if you have 83.7 mL of 1.5 M of Na OH, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts, show work)

	General Chemistry I (CHEM 101) 10/18/12 9:55 am T,R Dr. Hahn form 955 B Exam # 4	(sign)
Name	(print) Name	(sigit)
luestion annot g	sow work for partial credit on the Long Answers and in some of the Short Answer Questions. Multip s have no partial credit. Please write anything you want graded legibly. If I cannot read your work rade it. (1 pts print and sign exam) 7 page Exam, 5 page exam + periodic table & solubility rules ch make sure you have the entire exam)	, I obviously
	$ extit{MULTIPLE CHOICE}$. Choose the one alternative that best completes the statement or answers the question, 26 pts total)	uestion. (2
1) Convert 1.25 atm to mm Hg. A) 950 mm Hg. B) 1520 mm Hg C) 1000 mm Hg D) 760 mm Hg E) 875 mm Hg	1)
2) Which of the following compounds is <u>insoluble</u> in water? A) MgSO ₄	2)
	B) Hg ₂ I ₂	
	C) (NH ₄) ₂ CO ₃	
	D) BaS	
	E) All of these compounds are soluble in water.	
3	Of Give the temperature and pressure at STP. A) 25°C and 30.00 in Hg B) 300K and 1 torr Hg C) 0°C and 1.00 atm D) 0°C and 1 mm Hg E) 0K and 1.00 atm	3)
4) Determine the concentration of a solution prepared by diluting 20.0 mL of a 0.200 M NaCl to 250.0 mL. $(M_1V_1 = M_2V_2)$	4)
	A) 0.160 M B) 0.0160 M C) 0.00800 M D) 0.0320 M E) 2.50 M	
5) According to the following balanced reaction, how many moles of KOH will be formed from 5.44 moles of H ₂ O? Assume an excess of KO.	5)
	$4 \text{ KO(s)} + 2 \text{ H}_2\text{O(l)} \rightarrow 4 \text{ KOH(s)} + \text{O}_2(g)$	
	A) 4.87 moles KOH B) 16.7 moles KOH C) 8.33 moles KOH D) 10.9 moles KOH E) 2.72 moles KOH	

6) Determine the limiting reactant (LR) and the mass (in g) of nitrogen that can be formed from 50.0 g N_2O_4 and 45.0 g N_2H_4 . Some possibly useful molar masses are as follows: $N_2O_4 = 92.02$ g/mol, $N_2H_4 = 32.05$ g/mol.					
N ₂	$_{2}O_{4}(l) + 2 N_{2}H_{4}(l) =$	• 3 N ₂ (g) + 4 H ₂ O(g)		
A) No LR, 45.0 g	N ₂ formed				
_	59.0 g N2 formed	N.			
C) $LR = N_2H_4$, 1	13.3 g N ₂ formed				
D) $LR = N_2O_4$, 4	5.7 g N ₂ formed				
E) $LR = N_2O_4$, 1	.05 g N ₂ formed				
7) What is the volume	e of 0.175 mol of O ₂ a	nt 7.78 atm and 415K	?		7)
A) 24.5 L	B) 565 L	C) 1.53 L	D) 25.0 L	E) 0.766 L	
8) How many H+ ions	s can the acid, H2SO	, donate per molec	ule?		8)
A) 0	B) 2	C) 1		D) 3	
9) Determine the mole	arity of a solution for n. (molar mass of Li			water to yield	9)
A) 2.30 M	B) 1.18 M	C) 0.130 M	D) 0.768 M	E) 1.50 M	
10) A mixture of 0.220	moles CO, 0.350 mole	es H2 and 0.640 mol	es He has a total pres	ssure of 2.95 atm.	10)
What is the pressur	re of CO?				
A) 0.955 atm	B) 0.536 atm	C) 0.649, atm	D) 1.54 atm	E) 1.86 atm	
11) Identify NaCl.					11)
A) nonelectrolyte					
B) weak electrol	yte				
C) weak acid D) strong electro	Irrto				
E) strong acid	ily te				
12) Which of the follow	ving solutions will ha	ve the highest conce	entration of chloride i	ons?	12)
A) 0.10 M NaCl	ū				
B) 0.05 M CaCl ₂					
C) 0.10 M MgCl ₂	2				
D) 0.10 M AlCl ₃					
E) All of these so	olutions have the sam	e concentration of c	hloride ions.		
13) What volume will (0.780 moles of He occ	rupy at STP?			13)
A) 43.7 atm	B) 15.6 L	C) 22.4 L	D) 17.5 L	E) 70.0 L	

Part II Short Answer: Write the word or phrase or circle the choice that best completes each statement or answer the question. (43 pts.)

14) 1. To calculate mass percent of carbon in CH4 the formula is (8 pts total, 4 pt s top, 4 pts bottom)

mass % = (a) 12.0 g (b) $2 \times 12.0 \text{ g}$ (c) $4 \times 1.01 \text{ g}$ (d) $[(4 \times 1.01) + 12.0] \text{ g}$ (circle one letter carbon (a) 12.0 g (b) $2 \times 12.0 \text{ g}$ (c) $4 \times 1.01 \text{ g}$ (d) $[(4 \times 1.01) + 12.0] \text{ g}$ (circle one letter)

2. The definition of molarity (M) is (8 pts, 4 pts top, 4 pts bottom)

molarity (M) = # _____ of solute # _____ of solution

3. For the following reaction complete the balancing of the equation by filling in a number into each of blanks for the missing coefficients. Note to balance chemical reactions, you change coefficients but you leave the subscripts alone. (9 ts, 3 pts each blank)

 $\underline{\qquad}$ $\underline{\qquad}$

- 4. Oxidation States: (10 pts total, 2 pts per blank)
- a. What is the oxidation state of Cl in Cl₂
- b. What is the oxidation state of elemental Ca
- c. What is the oxidation state of Sn in SnO₂ Show work below by filling in the following blanks.

oxidation state of O is _____ charge on SnO₂ is _____

oxidation state of Sn is _____

$$Na_2CO_3$$
 (aq) + Ca Cl_2 (aq) ----> 2 Na Cl (aq) + Ca CO_3 (s)

a Give the complete ionic equation for the precipitation molecular equation above. by filling in the blanks

$$2 \text{ Na}^{+1}_{(aq)} + \text{CO}_3^{-2}(aq) + \text{Ca}^{+2}(aq) + 2 \text{ Cl}^{-1}(aq) -> 2 \text{ Na}^{+1}(aq) + 2 \text{ Cl}^{-1}(aq) +$$
 (s)

b . Give the net ionic equation for the precipitation molecular equation above. by filling i the blanks.

$$(aq) + CO_3^{-2}(aq) ---> Ca CO_3 (s)$$

$$H_2SO_4 + 2 Li OH ---> Li_2 SO_4 + 2 H_2O$$

a . For the above balanced chemical reaction (assuming complete reaction and a large excess of the other reactant), if you start the reaction with 14.7 grams of LiOH (molar mass LiOH = 23.95 g LiOH/mol LiOH) how many grams of Li2 SO4 (molar mass Li2SO4 = 109.98 g Li2SO4 / mol Li2SO4) would you get? (15 pts, show work)

b. For the above balanced chemical reaction, if you have 83.7 mL of 1.3 M of Li OH, how many moles of H₂O will you make assuming complete reaction and a large excess of the other reactant. (15 pts, show work)