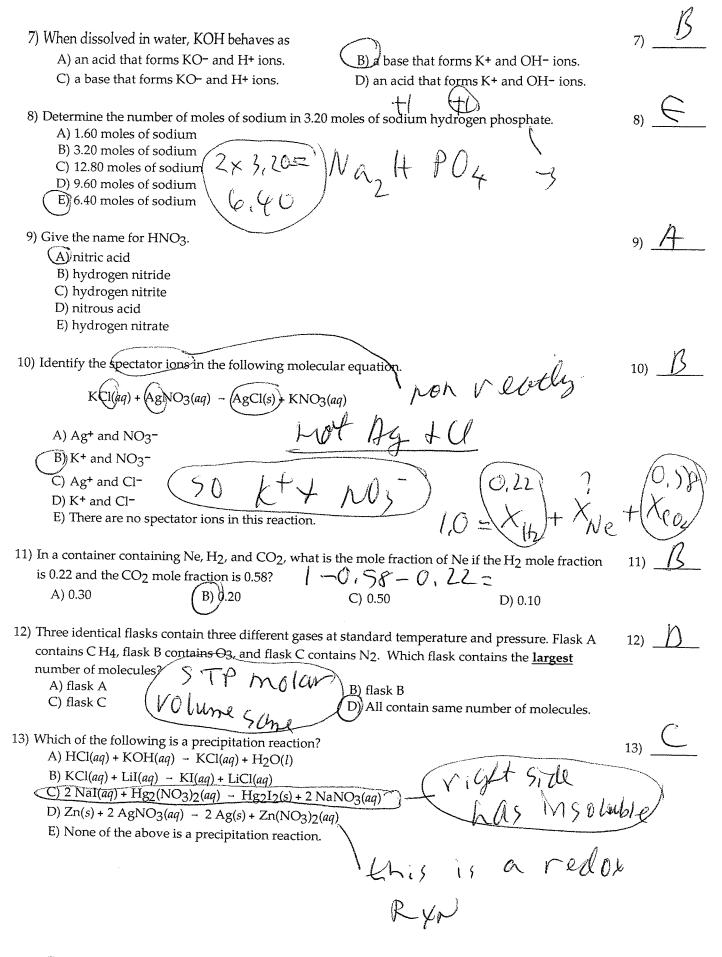
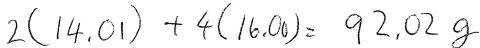
General Chemistry I Lea	ture Fall 2016 10/17/16 M	Exam II form Gre	en Dr. Hahn E	xam #	
Name	7	_ (print) Name		- M.	(sign)
choice questions have no continue on the empty be cannot read it, I obvious	rtial credit and full credit of partial credit. Please work pages but clearly labely cannot grade it). Returnate there are 7 real pages	rite anything you wa I where the remaining I your entire exam ind	nt graded legibly. g answer can be fou cluding the periodic	If you run out of spand. (If I can't find	pace , please
1 mole = molar mass	$= 6.022 \times 10^{23}$ PV=nI	RT $R = 0.08206 (L$	atm/(molK) $K = C$	PC + 273.15	
$\frac{P_1V_1}{P_2V_2} = \frac{T_1}{T_2} $ 760	torr = 760 mm Hg = 1.00 atm	osphere			
MULTIPLE CHOICE. C 26 pts total)	hoose the one alternative	that best completes	the statement or ar	nswers the question	n. (2 pts each,
1) Which one of t A) FeS	he following compounds is B) Cu(NO3)		(PO ₄) ₂ I	O) SrCO3	1) _B
2) What is the cor A) 0.225 M	ncentration of nitrate ions in B) 0.450 M	n a 0.225 M Sr(NO ₃) C) 0.112 M	2 solution? D) 0.675 M	E) 0.725 M	2) <u>B</u>
B) strong ele C) strong ele	etrolyte, strong base ectrolyte, strong base ectrolyte, weak base etrolyte, weak base	7= bad	225 x2=	0,45/ BBA= ba	3) <u>D</u>
4) Identify acetic A) strong ele B) weak elec C) strong ele	acid. ctrolyte, strong acid trolyte, weak acid ctrolyte, weak acid trolyte, strong acid	A= not VW= no	atlengter Work	bad attems	4) <u>B</u>
B) magnesiu magnesiu D) magnesiu:	ium phosphorustetraoxide m(III) phosphite m phosphate	Onic-	to #		5)
6) The atmospheri A) 760 torr	c pressure is 715 mm Hg. V B) 715 torr	What is the pressure i C) 29.5 torr	torr? D) 13.5 torr	E) 28.1 torr	6)



- II. Short Answers (48 pts)
 - 1. Given the following molecule, show your calculation of the molecular formula mass (molar mass of the molecule). (5 pts)

N₂O₄



NW = -2D)

2. Is the following molecule [(soluble) or (insoluble)] (circle one)? Explain your reasoning in a few words. (5 pts)

Ag₂ SO₄

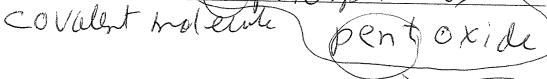
SO42 usually soluble but Ag is exception

3. Nomenclature (6 pts total, 3 pts each)

a. Name of the molecule

diphosphorus

 P_2O_5

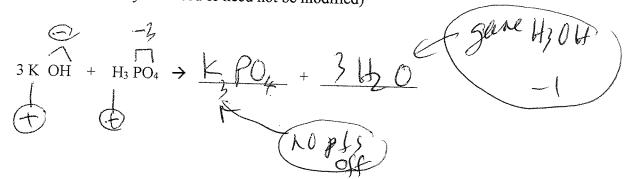


b. Name of the acid

Aydro—icacid

H Br

4 Given the following acid base reaction, complete & balance the reaction. (6 pts total, 3 pts each) (left side is already balanced & need not be modified)



5. If I dissolve the following in water, what will be the identity of the blanks? (6 pts total, 3 pts each)
$K_2SO_4(aq) \rightarrow 2k^+(aq) + 504(aq) BA-12$
6. a. What is the molarity of the reagent made from 2.54 grams of H Cl (FW HCl = 36.46 g/mol) (5 pts) (M = #moles / liter) by addition of solution up to the 250.0 mL line? 2.54gH (1) 2.54gH (2) 3.646gH (2) 4.646gH (2) 4.646gH (2) 5.646gH (2) 6. If you dilute that reagent by taking 10.0 mL of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the property of the standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the property of the standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity? (5 pts) (M ₁ V ₁ = M ₂ V ₂) 6. The standard of the above reagent and adding enough water to make up 100.0 mL, when the standard of the above reagent and adding enough water to make up 100.0 mL, when the standard of the above reagent and adding enough water to make up 100.0 mL, when the standard of the above reagent and adding enough water to make up 100.0 mL, when the standard of the above reagent and adding enough water to make up 100.0 mL (100.0 mL) (100.0 m
NaCl HF (HNO3) NH3 (KOH) HC2H3O2 Weak 8. What is the oxidation state of the following? Either explain or show work. (8 pts, 4 pts per blank) Fe Zero element in most stable form
N in NO ₃ \longrightarrow
9 If at STP (0° C and 1 atm) I have 3.5 moles of the gas CH ₄ , how many liters of CH ₄ do I have? Show work. (STP volume = 22.4 Liters) (5 pts) 184 liters of CH ₄
3. Smal x 22.41 = 78.4
Dr. Hahn General Chemistry I Exam II Green 10/17/16 4

III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.

- 1. Theoretical Yield (20 pts)
 - 2 $K_3 PO_4 + 3 CaCl_2 \rightarrow 6 K Cl + Ca_3 (PO_4)_2(s)$
 - a. What is the theoretical yield in grams for the calcium phosphate from the reaction above if you start with 3.44 grams of $CaCl_2$ reacting to produce the Ca_3 (PO₄)₂(s)? {FW(CaCl₂) = 110.99 g/mol $FW(Ca_3 (PO_4)_2 = 310.21 \text{ g/mol}) \text{ (show work) } (10 \text{ pts})$

Yield in grams a Ch

b. If the theoretical yield of the product Ca₃ (PO₄)₂ based on the number of grams of the starting material & PO₄ is 6.07 grams Ca₃ (PO₄), which is the limiting reagent? Circle one (5 pts) [compare with theoretical yield you calculated in part (a)]

 $[(K_3 PO_4) \text{ or } (CaCl_2)]$ General Chemistry Exam II Green 5

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c. If I have 1.78 moles of the calcium phosphate [Ca_3 (PO₄)₂], how many atoms of oxygen do I have (N_A = 6.022 x 10²³)? (5 pts)

$$\begin{array}{cccc}
1 & mol & = 4 * 2 = 8 & moles \\
(a_2(f)_4)_2 & & & & & & & & & \\
(a_2(f)_4)_2 & & & & & & & & & \\
(a_3(f)_4)_2 & & & & & & & & \\
(a_3(f)_4)_2 & & & & & & & \\
(a_3(f)_4)_2 & & & & & & & \\
(a_3(f)_4)_2 & & & \\
(a_3(f)_4)_2 & & & \\
(a_3(f)_4)_2 & & & & \\
(a_3(f)_4)_2 & & & \\
(a_3(f)_4)_2 & & & & \\
(a_3(f)_4)_3 & & & \\
(a_3(f)_4)_4 & & & \\
(a_$$

2. Gas Law: (10 pts) Given the ideal gas law PV = n R T

I have 1.2 moles of a gas in a gas cylinder of 305.1 mL at 753.1 torr, what is the temperature of the gas in Kelvin? [R = 0.08206 (L atm) / (mol K)]

$$N = 1.2 \text{ mol}$$
 $V = 205.1 \text{ ml} \times \frac{12}{1000 \text{ ml}} = 0.30512$
 $P = 153.1 \text{ ton} * \frac{1 \text{ afm}}{7 \text{ co ton}} = 0.9909 \text{ afz}$
 $T = 7$
 $T = 7$

R = 0,08206 later

(0,9909ah)(0,3051l)= (1,24ml)(0,08206)(T

(0,9909a)(0,305/t)

(1,2 md) (0,0826/toth) = 3,07 Kolvin

(BA-5) (mall algebra -2)

General Chemistry I Lecture Fall 2016 10/17/16 M Exam II form White Dr. Hahn Exam#		
Name(print) Name	(sign)	
Please show work for partial credit and full credit on the Long Answers and in some of the Short Answer Quehoice questions have no partial credit. Please write anything you want graded legibly. If you run out of continue on the empty back pages but clearly label where the remaining answer can be found. (If I can't fin cannot read it, I obviously cannot grade it). Return your entire exam including the periodic table. (Please write any pages and make sure there are 7 real pages + periodic table+ solubility chart.)	f space , please	e ro
1 mole = molar mass = 6.022×10^{23} PV=nRT R = $0.08206 \text{ (L atm)/(mol K)}$ K = 0.08206×10^{10} K = 0.08206×10^{1		
$P_1V_1 = T_1$ 760 torr = 760 mm Hg = 1.00 atmosphere P_2V_2 T_2		
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the quest 26 pts total)	ion. (2 pts eac	h,
	1) <u>D</u>	
KCl(aq) + AgNO3(aq) - AgCl(s) + KNO3(aq)		
1) Identify the spectator ions in the following molecular equation. KCl(aq) + AgNO ₃ (aq) - AgCl(s) + KNO ₃ (aq) A) K+ and Cl- B) Ag+ and NO ₃ - C) Ag+ and Cl- D)K+ and NO ₃ - E) There are no spectator ions in this reaction. M Show Show Show Show Show Show Show Sho		
2) What is the concentration of nitrate ions in a 0.225 M Sr(NO ₃) ₂ solution? A) 0.675 M B) 0.450 M C) 0.112 M D) 0.725 M E) 0.225 M	2) _B	
3) Determine the number of moles of sodium in 3.20 moles of sodium hydrogen phosphate. (A) 6.40 moles of sodium (B) 1.60 moles of sodium (C) 3.20 moles of sodium (D) 9.60 moles of sodium (E) 12.80 moles of sodium	3)	
4) Which of the following is a precipitation reaction? A) $Zn(s) + 2 AgNO_3(aq) - 2 Ag(s) + Zn(NO_3)_2(aq)$ B) $2 NaI(aq) + Hg_2(NO_3)_2(aq) - Hg_2I_2(s) + 2 NaNO_3(aq)$ C) $HCl(aq) + KOH(aq) - KCl(aq) + H_2O(l)$ D) $KCl(aq) + LiI(aq) - KI(aq) + LiCl(aq)$	4)	
E) None of the above is a precipitation reaction. 5) When dissolved in water, KOH behaves as A) a base that forms KO- and H+ ions. C) a base that forms K+ and OH- ions. D) an acid that forms KO- and H+ ions. D) an acid that forms KO- and H+ ions.	5)	

® weak electr C) weak electr	rolyte, strong acid olyte, weak acid olyte, strong acid rolyte, weak acid			6) <u>B</u>
7) Give the name fo A) hydrogen n B) nitrous acid C) hydrogen n D nitric acid E) hydrogen n	itrite itride			7) <u>D</u>
8) The atmospheric A) 29.5 torr	pressure is 715 mm Hg. Wi B) 13.5 torr		0 torr (F) 715 torr	8)
B) strong electrong electrong	olyte, strong base olyte, strong base olyte, weak base olyte, weak base			9)
10) Which one of the A) Cu ₃ (PO ₄) ₂	ollowing compounds is <u>sol</u> B)Cu(NO3)2	luble in water? C) SrCO3	D) FeS	10)
11) Write the name fo A) magnesium B) trimagnesium C) magnesium D) magnesium E) magnesium	phosphite n phosphorustetraoxide III) phosphite phosphate			11)
12) Three identical flas contains C H4, flas number of molecu A) flask A C) flask C	ks contain three different g k B contains O3, and flask (es?	C contains N2. Which fla	ture and pressure. Flask A sk contains the <u>largest</u> me number of molecules.	12)
13) In a container contains 0.22 and the CO ₂ A) 0.10	aining Ne, H_2 , and CO_2 , wind mole fraction is 0.58? (B) 0.20	hat is the mole fraction of C) 0.30	Ne if the H_2 mole fraction D) 0.50	13)

II.	Short	Answers (48	pts)
**.	OHOLE	LILLOTTOID		Pi

1. Given the following molecule, show your calculation of the molecular formula mass (molar mass of the molecule). (5 pts)

P20s 2(30,91) +5(16,00)= 141,949/mil

2. Is the following molecule [(soluble) or (insoluble)] (circle one)? Explain your reasoning in a few words. (5 pts)

(NH₄)₂S S⁻² us welly insoluble (NE-2½) but NH₄ is or ceptor so Soluble

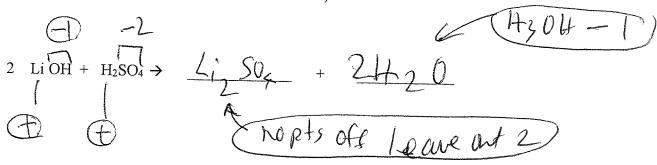
- 3. Nomenclature (6 pts total, 3 pts each)
- a. Name of the molecule

N204 dinitrogen tetroxide Covallet molembe - USE # pretix

b. Name of the acid <u>Nitvicacid</u>

HNO3

Given the following acid base reaction, complete & balance the reaction. (6 pts total, 3 pts each) (left side is already balanced & need not be modified)



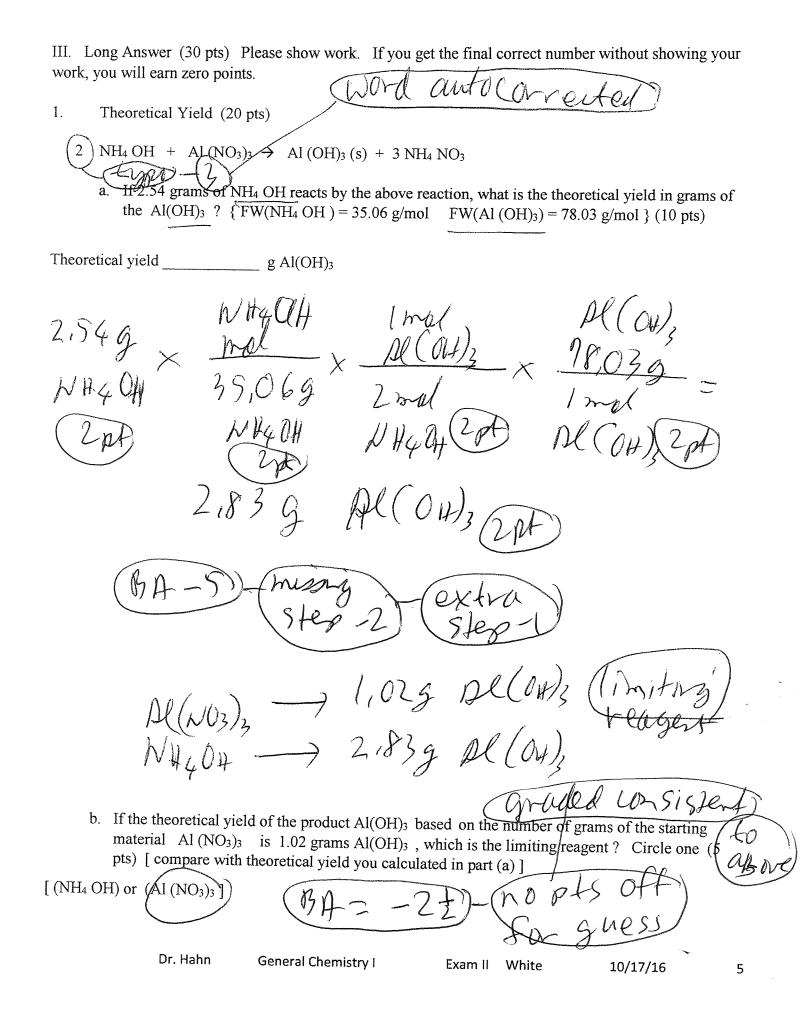
Dr. Hahn

General Chemistry I

Exam II White

10/17/16

5. If I dissolve the following is	n water, what will be	the identity of the	blanks? (6 pts total, 3 pts each)
$Ba (NO_3)_2 (aq) \rightarrow \mathcal{B} \mathcal{A}^{+2}$			00976
24 (1103)2 (uq) / 1/0	(aq) +	_ (aq)	0,07/6/11
6. a. What is the molarity of	of the reagent made fr	-L2 6A	of H Cl (FW HCl = 36.46)
g/mot) (3 pts) (M = #moles	s / liter) by addition o	f solution up to t	he 500.0 mL line?
1,18g × hal Hel (9,04882L	ol 40	M= 0,04802 (5-1 0,5000 (
1240	900,0 ml	× 1000	T=0,5000 (
b. If you dilute that reagent by to up 250.0 mL, what is the dil	aking 25.0 mL of the	above reagent and	adding enough water to make
V1=25,0 M M = 0,	0916m	s) $(M_1 V_1 = M_2 V_2)$	One (BA-74)
(0,0976m)(25,000	2) = (M)(250,0 mg	
$M_{2} = (0.0916)$	m) (25,0 ml)	1230,0x	$n = 9.76 \times 10^{-3} $
7. Given the following, circle all	which are a weak ele	ectrolyte? (12 pt	s, 2 pts each)
NaCl HF HNO ₃	NH ₃	КОН	H C ₂ H ₃ O ₂
8. What is the oxidation state of t	the following? Fither	Sale	weakaey
N2 ZRAD Chemen	t in mi	st Stan	work. (8 pts, 4 pts per blank)
(BA-2)			1 6 m
P in PO ₄ -3	P+4(-2)	= -}	algebra + rald
(BA-2)	P = -3 +	82 +	5
9 If at STP (0° C and 1 atm) I have Show work. (STP volume = 22.4 Lite.)	13) (3 0(8)		
$\frac{30.14}{\text{MA}-23}$ liters of CH ₄ $(.5)$	molx 22	4l = 3	0.260
(BA-22)	\ ye/	d	
Dr. Hahn Gener	al Chemistry I	Exam II White	10/17/16 4



c. If I have 2.72 moles of the aluminum nitrate , how many atoms of oxygen do I have ($N_A = 6.022 \times 10^{23}$) ? (5 pts)

2/12 mil Dl(N03)3	mol = Dl(NO3),	(3*5) md
2,72 mel X De(ND3),	Thate I mel pe (NOr)z	2pt 0 arums=25 6,022×10 125 0
	10° atom Q	
194-2. math.		

2.	Gas Law:	(10 pts)
		(10 00)

Given the combined gas law

$$\frac{P_2V_2}{P_1V_1} = \frac{T_2}{T_1} \left(\frac{P_2V_2}{P_1V_1} \right)$$

 $\frac{P_2V_2}{P_1V_1} = \frac{T_2}{T_1} \left(\text{BA} = -5 \right)$

I have a mixed gas system at 0° C at 1.01 atmosphere occupying 258.1 mL. If I heat the system to 25° C at the same time that I increase the pressure to 2.3 atmosphere, what volume will the gas occupy? $(K = {}^{\circ}C + 273.15)$



(O, 2581 S)

$$V_2 = \frac{(298,15)(1,0)a(4)}{(213,15)(2,3a(4))}$$

Dr. Hahn

General Chemistry I

Exam II White

10/17/16

ame		(print) Name	,		(sign)
lease show work for partial credit and fultiple choice questions have no parties continue on the empty back panswer or cannot read it, I obviously c	tial credit. Figes but clearly annot grade it	lease write anything label where the results. Return your enteres.	ng you want grad emaining answer tire exam includir	led legibly. If you rui can be found. (If I can ng the periodic table.	n out of spa
ount your exam pages and make sure	there are 7 r	eal pages + period	lic table+ solubilit	y chart .)	
$mole = molar mass = 6.022 \times 10^{2}$	23 PV=nR	R = 0.08206	(L atm)/(molK)	$K = {}^{9}C + 273.15$	
$P_1 V_1 = T_1$ 760 torr = 760 mr	n Hg = 1.00 atn	nosphere			
P_2V_2 T_2					
IULTIPLE CHOICE. Choose the on 5 pts total)	e alternative	that best complete	es the statement	or answers the questi	on. (2 pts ea
1) Which one of the following	compounds is	soluble in water?			1)
A) FeS	B) Cu(NO3)2		3(PO ₄) ₂	D) SrCO3	
2) What is the concentration o	f nitrate ions ii	n a 0.225 M St(NO:	2)2 solution?		2)
·	.450 M	C) 0.112 M	D) 0.675 M	E) 0.725 M	-/ <u></u>
3) Identify ammonia.					3)
A) weak electrolyte, stroi	-				
B) strong electrolyte, stro	•				
C) strong electrolyte, wea					
E) nonelectrolyte	K Dase				
ii) itolioidelloi) te					
4) Identify acetic acid.					4)
A) strong electrolyte, stro	-				
B) weak electrolyte, wea					
C) strong electrolyte, wea D) weak electrolyte, stroi					
E) nonelectrolyte	ig aciu				
•	.				F.\
5) Write the name for Mg3(PC					5)
A) trimagnesium phosph B) magnesium(III) phosp		2			
C) magnesium phosphat					
D) magnesium phosphite					
E) magnesium(II) phosp					
6) The atmospheric pressure is	5715 mm Hg.	What is the pressu	ure in torr?		6)
	15 torr	C) 29.5 torr	D) 13.5 torr	E) 28.1 torr	~/

7) When dissolved in water, KOH be	ehaves as			7)	
A) an acid that forms KO- and		B) a base that	forms K+ and OH- ions.	,	
C) a base that forms KO- and I			t forms K+ and OH- ions.		
8) Determine the number of moles of	of sodium in 3.20	moles of sodium l	hydrogen phosphate.	8)	
A) 1.60 moles of sodium B) 3.20 moles of sodium					
C) 12.80 moles of sodium					
D) 9.60 moles of sodium					
E) 6.40 moles of sodium					
9) Give the name for HNO3.				0)	
A) nitric acid				9)	
B) hydrogen nitride					
C) hydrogen nitrite					
D) nitrous acid					
E) hydrogen nitrate					
10) Identify the spectator ions in the f	following molect	ılar equation.		10) _	
$KCl(aq) + AgNO_3(aq) \rightarrow$	AgCl(s) + KNO3	(aq)			
A) Ag+ and NO ₃ -					
B) K+ and NO ₃ -					
C) Ag+ and Cl-					
D) K+ and Cl-					
E) There are no spectator ions	in this reaction.				
11) In a container containing Ne, H ₂ ,	and CO2 what	is the male fraction	of Ne if the Hamole fraction	11)	
is 0.22 and the CO ₂ mole fraction		o die mole metror	or we is the 112 more intenor	11)	
A) 0.30 B) 0.3		C) 0.50	D) 0.10		
12) Three identical flasks contain three	_		~	12) _	
contains CH4, flask B contains Og number of molecules?	3, and flask C co	ntains N ₂ . Which	flask contains the <u>largest</u>		
A) flask A		B) flask B			
C) flask C		•	same number of molecules.		
c) men c		Dy zm comun	suite number of morecures.		
13) Which of the following is a precip				13) _	
A) $HCl(aq) + KOH(aq) - KCl(aq)$	• –				
B) $KCl(aq) + Lil(aq) - Kl(aq) +$		1 NIO ()			
C) $2 \text{ NaI}(aq) + \text{Hg}_2(\text{NO}_3)_2(aq)$	-				
D) $Zn(s) + 2 AgNO_3(aq) - 2 AgNO_3(aq)$		• • •			
F) None of the above is a preci	initation reaction				

II.	Short	Answers	(48	nts)	١
11.	JIIOIL	THISTYCES	(70	Pus	ş

1. Given the following molecule, show your calculation of the molecular formula mass (molar mass of the molecule). (5 pts)

 N_2O_4

2. Is the following molecule [(soluble) or (insoluble)] (circle one)? Explain your reasoning in a few words. (5 pts)

Ag₂ SO₄

- 3. Nomenclature (6 pts total, 3 pts each)
- a. Name of the molecule

 P_2O_5

b. Name of the acid _____

H Br

Given the following acid base reaction, complete & balance the reaction. (6 pts total, 3 pts each) (left side is already balanced & need not be modified)

3 K OH + H₃ PO₄ → _____ + ____

5.	If I dissolve the following in water, what will be the identity of the blanks? (6 pts total, 3 pts each)
K ₂ SO	$_{4}\left(\mathrm{aq}\right) \Rightarrow$ (aq) +(aq)
6.	a. What is the molarity of the reagent made from 2.54 grams of H Cl (FW HCl = 36.46 g/mol) (5 pts) (M = $\#$ moles / liter) by addition of solution up to the 250.0 mL line?
b.	If you dilute that reagent by taking 10.0 mL of the above reagent and adding enough water to make up 100.0 mL, what is the diluted molarity ? (5 pts) $(M_1V_1 = M_2V_2)$
7. NaCl	Given the following, circle all which are a strong electrolyte ? (12 pts, 2 pts each) HF HNO_3 NH_3 KOH $HC_2H_3O_2$
8. Fe _	What is the oxidation state of the following? Either explain or show work. (8 pts, 4 pts per blank)
N in I	NO ₃
9 Show	If at STP (0° C and 1 atm) I have 3.5 moles of the gas CH ₄ , how many liters of CH ₄ do I have ? work. (STP volume = 22.4 Liters) (5 pts) liters of CH ₄

III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.

- 1. Theoretical Yield (20 pts)
 - 2 $K_3 PO_4 + 3 CaCl_2 \rightarrow 6 K Cl + Ca_3 (PO_4)_2 (s)$
 - a. What is the theoretical yield in grams for the calcium phosphate from the reaction above if you start with 3.44 grams of $CaCl_2$ reacting to produce the Ca_3 (PO_4)₂ (s) ? { $FW(CaCl_2) = 110.99$ g/mol $FW(Ca_3) (PO_4)_2 = 310.21$ g/mol} (show work) (10 pts)

Yield	in	grams	

b. If the theoretical yield of the product Ca₃ (PO₄)₂ based on the number of grams of the starting material K₃ PO₄ is 6.07 grams Ca₃ (PO₄)₂, which is the limiting reagent? Circle one (5 pts) [compare with theoretical yield you calculated in part (a)]

[$(K_3 PO_4)$ or $(CaCl_2)$]



2. Gas Law: (10 pts) Given the ideal gas law PV = n R T

I have 1.2 moles of a gas in a gas cylinder of 305.1 mL at 753.1 torr, what is the temperature of the gas in Kelvin? [R = 0.08206 (L atm) / (mol K)]

Dr. Hahn General Chemistry I

ame		(print) Name			(sign)
ease show work for parti noice questions have no p ontinue on the empty bac nnot read it, I obviously cam pages and make sure	artial credit. Please was Please was pages but clearly labor cannot grade it). Retur	rrite anything you w el where the remaini n your entire exam i	rant graded legibly. ng answer can be fo ncluding the period	If you run out of und. (If I can't find	space , please
mole = molar mass = 0	6.022×10^{23} PV=	R = 0.08206 (L atm)/(molK) K =	°C + 273.15	
$\frac{P_1 V_1}{2 V_2} = \frac{T}{T_2} \qquad 760 \text{ to}$	orr = 760 mm Hg = 1.00 atr	nosphere			
ULTIPLE CHOICE. Cho	pose the one alternative	e that best complete	s the statement or a	nswers the questi	on. (2 pts each,
1) Identify the spec	tator ions in the followi	ng molecular equatio	on.		1)
KCl(aq)	+ AgNO3(aq) - AgCl(s) + KNO3(aq)			
A) K+ and Cl-B) Ag+ and No C) Ag+ and Cl D) K+ and No E) There are n	O ₃ - -	eaction.			
2) What is the conce A) 0.675 M	entration of nitrate ions			F) 0.005.14	2)
A) 0.6/3 M	B) 0.450 M	C) 0.112 M	D) 0.725 M	E) 0.225 M	
3) Determine the nu A) 6.40 moles of B) 1.60 moles of C) 3.20 moles of D) 9.60 moles of E) 12.80 moles	of sodium of sodium of sodium	m in 3.20 moles of so	odium hydrogen pho	osphate.	3)
A) Zn(s) + 2 Ag B) 2 NaI(aq) + 1 C) HCl(aq) + K D) KCl(aq) + Li	owing is a precipitation \$NO3(aq) - 2 Ag(s) + Z Hg2(NO3)2(aq) - Hg2 OH(aq) - KCl(aq) + H2 I(aq) - KI(aq) + LiCl(aq above is a precipitation	n(NO3)2(aq) I2(s) + 2 NaNO3(aq) O(l))			4)
A) a base that f	n water, KOH behaves a orms KO- and H+ ions. orms K+ and OH- ions.	B) an a	acid that forms K+ and that forms KO-		5)

6) Identify acetic acid.					6)
A) strong electrol	yte, strong acid				
B) weak electroly	te, weak acid				
C) weak electroly	_				
D) strong electrol	=				
E) nonelectrolyte					
7) Give the name for H	NO3.				7)
A) hydrogen nitri	te				
B) nitrous acid					
C) hydrogen nitri	de				
D) nitric acid					
E) hydrogen nitra	ite				
8) The atmospheric pre					8)
A) 29.5 torr	B) 13.5 torr	C) 28.1 torr	D) 760 torr	E) 715 torr	
0) 11					
 9) Identify ammonia. A) weak electrolyt 	ta atrana hasa				9)
B) strong electroly	•				
C) weak electrolyt					
D) strong electroly					
E) nonelectrolyte	,				
·					
10) Which one of the foll	owing compounds is	soluble in water?			10)
A) Cu ₃ (PO ₄) ₂	B) Cu(NO ₃) ₂)3	D) FeS	20)
11) Write the name for M	Ig3(PO ₄) ₂ .				11)
A) magnesium phe	osphite				/
B) trimagnesium p	ohosphorustetraoxide				
C) magnesium(III)					
D) magnesium pho	~				
E) magnesium(II)	phosphite				
10) 77					
12) Three identical flasks	contain three differer	nt gases at standard	temperature and p	ressure. Flask A	12)
	3 contains O3, and flas	sk C contains N2. W	hich flask contain	s the <u>largest</u>	
number of molecules	?				
A) flask A		B) flask			
C) flask C		D) All co	ontain same numb	er of molecules.	
13) In a containor contain	ina Na III 1 CO	1 1			
13) In a container contain		, what is the mole fr	action of Ne if the	H ₂ mole fraction	13)
is 0.22 and the CO_2 m		<u></u>			
A) 0.10	B) 0.20	C) 0.30	I	0) 0.50	

II.	Short	Answers	(48	nts)
LL.	DHOIL	THISWOIS	טדט	PW

1. Given the following molecule, show your calculation of the molecular formula mass (molar mass of the molecule). (5 pts)

 P_2O_5

2. Is the following molecule [(soluble) or (insoluble)] (circle one)? Explain your reasoning in a few words. (5 pts)

 $(NH_4)_2 S$

- 3. Nomenclature (6 pts total, 3 pts each)
- a. Name of the molecule

 $N_2 O_4$

b. Name of the acid

H NO₃

- Given the following acid base reaction, complete & balance the reaction. (6 pts total, 3 pts each) (left side is already balanced & need not be modified)
 - 2 Li OH + H₂SO₄ → _____ +

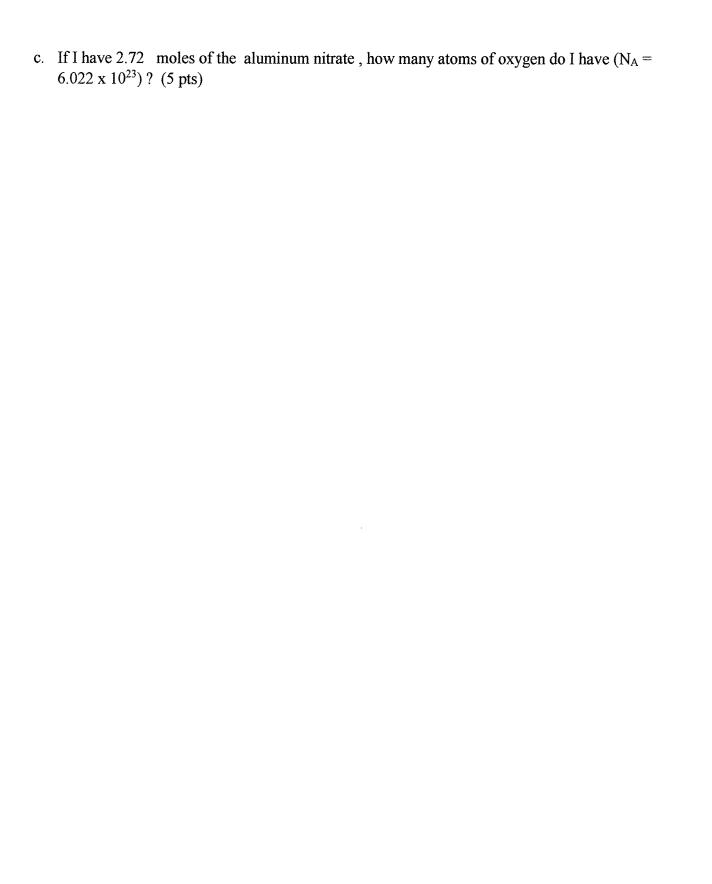
5.	lf I di	ssolve the t	ollowing in wa	ter, what will be the	ne identity of the	ne blanks? (6 pts total, 3 pts ea	ch)
Ba (N	O ₃) ₂ (aq) →	(aq)) +	_ (aq)		
6.	a. g/mol)	What is the (5 pts) (N	molarity of the	e reagent made from	m 1.78 gram solution up to	s of H Cl (FW HCl = 36.46) the 500.0 mL line?	
b.	If you up 250	dilute that re .0 mL, wha	eagent by taking at is the diluted	g 25.0 mL of the a molarity? (5 pts	above reagent at $(M_1V_1 = M_2V_1)$	and adding enough water to mak V_2)	æ
7.	Given t	he followinį	g, <u>circle all</u> whi	ich are a <u>weak ele</u>	ctrolyte? (12	pts, 2 pts each)	
NaCl		HF	HNO ₃	NH_3	КОН	H C ₂ H ₃ O ₂	
8. N ₂		the oxidation	on state of the fo	ollowing? Either	explain or sho	ow work. (8 pts, 4 pts per blank)
P in PC	D ₄ -3						
SHOW W	If at STI ork. (S	1P volume	1 atm) I have 1. = 22.4 Liters) (.35 moles of the (5 pts)	gas CH4, how r	many liters of CH ₄ do I have ?	

- III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.
- 1. Theoretical Yield (20 pts)
 - 2 NH₄ OH + Al (NO₃)₃ \rightarrow Al (OH)₃ (s) + 3 NH₄ NO₃
 - a. If 2.54 grams of NH₄ OH reacts by the above reaction, what is the theoretical yield in grams of the Al(OH)₃ ? { $FW(NH_4 OH) = 35.06 \text{ g/mol}$ $FW(Al (OH)_3) = 78.03 \text{ g/mol}$ } (10 pts)

Theoretical yield	g	Al(OH) ₃
•	 \sim	\ /~

b. If the theoretical yield of the product Al(OH)₃ based on the number of grams of the starting material Al (NO₃)₃ is 1.02 grams Al(OH)₃, which is the limiting reagent? Circle one (5 pts) [compare with theoretical yield you calculated in part (a)]

[(NH₄ OH) or (Al (NO₃)₃]



2. Gas Law: (10 pts)

Given the combined gas law
$$P_2V_2 = T_2$$

 P_1V_1 T_1

I have a mixed gas system at 0° C at 1.01 atmosphere occupying 258.1 mL. If I heat the system to 25° C at the same time that I increase the pressure to 2.3 atmosphere, what volume will the gas occupy? (K = $^{\circ}$ C + 273.15)