General C	hemistry I Lecture	e Fall 2017 9/20/17 Me	onday 9 am class	Exam II Dr. Ha	ahn Exam#	
Name	Kers		(print) Name	***************************************		_(sign)
Multiple of continue of cannot in exam page.  It is your rinto Dr. H	hoice questions had on the empty back read it, I obviously as and make sure t esponsibility to <u>re</u> ahn's hands. If yo	turn the entire exam poor	Please write anything where the remaining or your entire example + periodic table as a ckage (with periodic disappears or site	ng you want grading answer can be in including the insembly )	ded legibly. If you runder found. (If I can't find yn periodic table. (Pleasy) inside the rest of the e	n out of space , ; your answer ise count your xam) directly
that exam	will count as an	UNEXCUSED missed e	exam.			
MULTIPL 18 pts tota		se the one alternative	that best completes	s the statement o	r answers the question	. (2 pts each,
		lubility rules, which o	one of the followi	ng compounds	should be insoluble	1)
	in water? (A) AgBr	B) NaCl	C) MgBr <sub>2</sub>	D) ZnCl <sub>2</sub>	F) FeCl <sub>2</sub>	m= 25,13
2)	The mass % of Hi	n methane (CH4) is_	[MW (CF	60  1 <sub>4</sub> ) = 2 <del>6.02 g</del> /mol	(4(1,01)/260)	×100= 25,13
	A)25.13	B) 7.743	C) 92.26	D) 74.87	E) 4.032 16,0	0
3)	A limiting reagen A) the reactant C) none of the a	you run out of last		limited product reactant you rur		3) <u>D</u>
		llowing will occur w	hen a solution of	Pb(NO <sub>3</sub> ) <sub>2</sub> (aq) i	s mixed with a	4)
	solution of KI(a	-		_		
		te of PbI <sub>2</sub> will form;		_	and the second s	
		te of Pb(NO <sub>3</sub> ) <sub>2</sub> will t				
	= =	te of KNO <sub>3</sub> will form		-	•	
	D) A precipita	te of PbI <sub>2</sub> will form;	Pb <sup>2+</sup> and I <sup>-</sup> are s	pectator ions.		
	E) No precipit	ate will form.				
5)	B) The solute is	always a solid and the the solution componer is the solution compone	it which makes up i	he smallest comp		5)
	(B)+ (C	ollowing will show stro	ong electrical signal	when electrodes	are placed in an	6) <u>A</u>
	A) strong electrong of the a			ak electrolyte n electrolyte		
	,	-	~ , no.			

Exam II

Fall 2017

9 am. class page 1

Dr. Hahn General Chemistry I Lecture

assuming comple		st number of individual pa			7)
A) none of the		B) Na Cl	2 pan	ti Cles	
(C)Mg Cl <sub>2</sub> )	partides	D) Li Cl	2 part 2 part	idei	
8) Give the name for	H <sub>2</sub> SO <sub>4</sub> .				8)
A) persulfuric a					
B) hyposulfuro Sulfuric acid					
D) sulfurous ac					
E) persulfurous	s acid				
9) The empirical fo	ormula of a compo	und of uranium and fluc	orine that is c	omposed of	9) /3
	and 32.4% fluoring			1	1
A) UF <sub>4</sub> .	BYUF <sub>6</sub> .	C) U <sub>2</sub> F <sub>4</sub>	D) HFo	ELLISE	

1. a. Balance the following reaction by filling in the blank for the missing coefficient. (15 pts, 5 pts per blank)

2 Na N<sub>3</sub> (s)  $\rightarrow$   $\sim$  Na (s) +  $\frac{3}{2}$  N<sub>2</sub> (g)

b. Show the number of each of the elements on the reactant and product side of the above reaction which you just balanced. (5 pts)

2 Na, 6 N { 2 Na, 6 N

2. Is Pb SO<sub>4</sub> [(soluble) or (insoluble)] (circle one) in water? Explain using where the parts of the compound show up in the solubilities rules table. (8 pts)

subodes soluble out l'insoluble exception

3. If you dissolve Na<sub>2</sub> SO<sub>4</sub> in water write out the product. The equation does not need to be balanced. (10 pts, 5 pts per blank)

 $Na_2 SO_4 (s) \rightarrow 2NL (aq) + SO_4 (aq)$ 

- 4 If you have a compound made up of 40.92 % C, 4.58% H and 54.50 % O by mass, in 100 grams of the compound, (10 pts, 5 pts each letter)
- (a) how many grams of oxygen (O) do you have? System grams oxygen (O) in 100 grams of compound

(b) how many moles of oxygen (O) do you have? (show work) -0 attend was = 16.00 54.50 g  $\times$   $\frac{16.00}{16.00}$  = 3.40 males 0

If you do a reaction given below and then do a calculation and find that: (9 pts) 5

 $4 \text{ NH}_3 (g) + 5 O_2 (g) \rightarrow 4 \text{ NO } (g) + 6 H_2 O (g)$ 

89.2 moles of NO is generated from the amount of NH<sub>3</sub>

40.8 moles of NO is generated from the amount of O<sub>2</sub>

Which is the limiting reagent?  $[(NH_3) \text{ or } (O_2)]$  (circle one).

lower quartity is hindly neaget

1. Given the following reaction, if you want to make 5.23 grams of NO (g), how many grams of water will be generated. (MW of NO = 30.01 g/mol) (MW of H<sub>2</sub>O = 18.02 g/mol) (show work) (15 pts)

 $4 \text{ NH}_3 (g) + 5 \text{ O}_2 (g) \rightarrow 4 \text{ NO } (g) + 6 \text{ H}_2 \text{ O} (g)$ 

N8 30.019

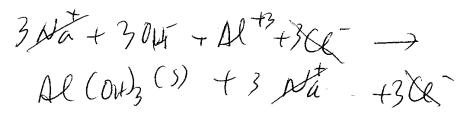
4 maly

18.02 g 18.02 g 18.02 g

= 4,71g to general

3 Na OH (aq) + Al Cl<sub>3</sub> (aq) 
$$\rightarrow$$
 Al (OH)<sub>3</sub> (s) + 3 Na Cl (aq)

(a) Write the complete ionic reaction.



(b) Write the net ionic reaction.

(c) What are the spectator ions? List the spectator ions.

Name(_	11 /	(mint) Name			(-:)	
	ly	(print) Name _			(sign)	
Please show work for partic Multiple choice questions he continue on the empty back or cannot read it, I obviously exam pages and make sure	al credit and full credi nave no partial credit. k pages but clearly la ly cannot grade it). R	it on the Long Answ Please write anythel bel where the remai eturn your entire ex	rers and in some of the thing you want graded ining answer can be fo am including the per	e Short Answer Que I legibly. If you ru ound. (If I can't find	ın out o l your a	
It is your responsibility to <u>r</u> into Dr. Hahn's hands. If y that exam will count as an	you do not and the ex	cam disappears or				
MULTIPLE CHOICE. Cho 32 pts total)	ose the one alternati	ve that best comple	tes the statement or a	nswers the questio	n. (2 pt:	s each,
1) A limiting reage	ent is				1)	A
	t you run out of first	<b>B)</b> 1	none of the above		•/ -	<del></del>
	t you run out of last		the limited product an	nount		
Which one of the aqueous solution	_	strong electrical sign	nal when electrodes as	re placed in an	2) _	B
A) 1	1 .	<u>س</u>	)			
A) non electro C) weak electr	_	(B)	trong electrolyte none of the above			
c) weak electr	olyte	<i>D</i> ) I	none of the above			_
3) In solutions	1990		s a liquid.		3) _	<u>B</u> _
A) The solute	is always a solid and	the solvent is alway	rs a liquid.	_		
C) The solute i	is the solution compo	ーチ(リ)(ハヤ・モ nent which makes u	p the smallest compo	nent of the solution		
			up the largest compor			
						0
4) The empirical t	_		nd fluorine that is co	omposed of	4) _	<u> </u>
			- II D	<b>.</b>		
67.6% uranium			133 1 1 2 1	E) UF <sub>8</sub> .		
	(b)(C) (c)	C) U3F4.	D) U <sub>2</sub> F.	-, C1 <b>6</b> .		
67.6% uranium A) UF <sub>4</sub> . 5) Based on the so	$\circ$		wing compounds sh		5) _	A
67.6% uranium A) UF4. 5) Based on the so in water?	olubility rules, whic	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	5) _	<u>A</u> _
67.6% uranium A) UF <sub>4</sub> . 5) Based on the so	$\circ$		·		5) _	<u>A</u>
67.6% uranium A) UF4. 5) Based on the so in water?	olubility rules, whic	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	5) <u>-</u> 6) <u>-</u>	A A
67.6% uranium A) UF4.  5) Based on the so in water? A) AgBr  6) Give the name for (A) nitric acid	olubility rules, which B) FeCl <sub>2</sub> or HNO <sub>3</sub> .	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	6) _	A A
67.6% uranium A) UF4.  5) Based on the so in water? A) AgBr  6) Give the name for A) nitric acid B) hydrogen n	olubility rules, which by FeCl <sub>2</sub> or HNO <sub>3</sub> .	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	6) _	A
67.6% uranium A) UF4.  5) Based on the so in water? A) AgBr  6) Give the name for A nitric acid B) hydrogen n C) hydrogen n	blubility rules, which blubility rules, which blub blub blub blub blub blub blub blu	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	6) _	A A
67.6% uranium A) UF4.  5) Based on the so in water? A) AgBr  6) Give the name for A) nitric acid B) hydrogen n	blubility rules, which blubility rules, which blub blub blub blub blub blub blub blu	h one of the follo	wing compounds sh	ould be <i>insoluble</i>	6) _	A A

Exam II

Fall 2017

10 am. class page

1

Dr. Hahn General Chemistry I Lecture

7) What percent by mass of oxygen is present in carbon monoxide, CO? [MW (CO)=28.01 g/mol]  (A) 57%	7) <u>A</u>
B) 60. %	
C) None of the above	
D) 59 %	
E) 58%	
8) Which of the following gives the largest number of individual particles in an aqueous solution assuming complete dissociation?  A) none of the above  B) Na Cl - 2 particles  C) Li Cl - 2 particles  D)Mg Cl <sub>2</sub> - 3 particles	8)
9) Which of the following will occur when a solution of Pb(NO <sub>3</sub> ) <sub>2</sub> (aq) is mixed with a	9) [3
solution of KI(aq)?	, <del>- :</del>
A) A precipitate of KNO <sub>3</sub> will form; Pb <sup>2+</sup> and I <sup>-</sup> are spectator ions.	
B)A precipitate of PbI <sub>2</sub> will form; K <sup>+</sup> and NO <sub>3</sub> <sup>-</sup> are spectator ions.	
C) A precipitate of PbI <sub>2</sub> will form; Pb <sup>2+</sup> and I <sup>-</sup> are spectator ions.	
D) No precipitate will form.	
E) A precipitate of Pb(NO <sub>3</sub> ) <sub>2</sub> will form; K <sup>+</sup> and I <sup>-</sup> are spectator ions.	
$Pb(N0)/2 + KI \rightarrow PbI_2 + KNC$ (5) Solution	)3 -10
50 ME	M-

1. a. Balance the following reaction by filling in the blank for the missing coefficient. (15 pts, 5 pts per blank)

2 K Cl O<sub>3</sub> (s) 
$$\rightarrow 2$$
 K Cl (s) +  $2$  O<sub>2</sub> (g)

Show the number of each of the elements on the reactant and product side of the above b. reaction which you just balanced. (5 pts)

2K, 2Cl, 60

(2K, 2a, 60

Na<sub>3</sub> PO<sub>4</sub> [ (soluble) or (insoluble) ] (circle one) in water? Explain using the where the parts of the compound show up in the solubilities rules table. (8 pts)

phosphates are insoluble except for alkali metals, Na is analkali

3. If you dissolve Al (NO<sub>3</sub>)<sub>3</sub> in water write out the product The equation does not need to be balanced. (10 pts, 5 pts per blank.)

Al (NO<sub>3</sub>)<sub>3</sub> (s)  $\rightarrow$  1 (aq) + 3 (aq)

- 4 If you have a compound made up of 40.92 % C, 4.58% H and 54.50 % O by mass, in 100 grams of the compound, (10 pts, 5 pts each letter)
- (a) how many grams of C do you have? 40,92 grams C in 100 grams of compound
- (b) how many moles of C do you have? (show work)

40,929 Cx <u>Iral</u> = 3,41 mal ( 54)

If you do a reaction given below and then do a calculation and find that: (9 pts) 5

$$8 \text{ H}_2 \text{ S (g)} + 4 \text{ O}_2 \text{ (g)} \rightarrow \text{ S}_8 \text{ (l)} + 8 \text{ H}_2 \text{ O (g)}$$

- 40.8 moles of S<sub>8</sub> is generated from the amount of H<sub>2</sub> S
- 89.2 moles of S<sub>8</sub> is generated from the amount of O<sub>2</sub>

Which is the limiting reagent ?  $[(H_2S)]$  or  $(O_2)$  ] (circle one)

run out of s before run out of

1. Given the following reaction, if you want to make 12.7 grams of  $S_8$ , how many grams of  $H_2$  S do you need? (MW of  $S_8 = 256.56$  g/mol) (MW of  $H_2$  S = 34.09 g/mol) (show work) (15 pts)

 $\partial Y H_2 S (g) + 4 O_2 (g) \rightarrow S_8 (l) + 8 H_2 O (g)$ 

2,79/x 1mol 58 S8 256,56g/x

3,5 g H25 needed

Mg Cl<sub>2</sub> (aq) + Na<sub>2</sub> CO<sub>3</sub> (aq) 
$$\rightarrow$$
 Mg CO<sub>3</sub> (s) + 2 Na Cl (aq)

(a) Write the complete ionic reaction.

$$mg^{+2} + 2SE + 2NE + (0_3^2 - )$$
  
 $mg(0_3(s)) + 2NE + 2SE$ 

(b) Write the net ionic reaction.

(c) What are the spectator ions? List the spectator ions.

Name		(print) Name			_(sign)
Please show work for partial Multiple choice questions ha continue on the empty back or cannot read it, I obviously	ve no partial credit. pages but clearly la cannot grade it). R	Please write anyth bel where the remain eturn your entire exa	ing you want graded in ing answer can be fou m including the perion	legibly. If you ru nd. (If I can't find	n out of s
exam pages and make sure t	here are real pag	ges + periodic table a	ssembly)		
It is your responsibility to <u>re</u> <u>into Dr. Hahn's hands.</u> If yo that exam will count as an	ou do not and the ex	cam disappears or si			
MULTIPLE CHOICE. Choo 18 pts total)		_			-
1) Based on the sol in water?	lubility rules, which	th one of the follow	ving compounds sho	uld be <i>insoluble</i>	1)
A) AgBr	B) NaCl	C) MgBr <sub>2</sub>	D) ZnCl <sub>2</sub>	E) FeCl <sub>2</sub>	
2) The mass % of H i	n methane (CH4) is	[MW (C	1 6 .0 4 (H <sub>4</sub> ) = 26.07 g/mol]		2)
A) 25.13	B) 7.743	C) 92.26	D) 74.87	E) 4.032	
A limiting reagen     A) the reactant     C) none of the a	you run out of last		ne limited product amo ne reactant you run ou		3)
4) Which of the fol	llowing will occur	when a solution of	f Pb(NO <sub>3</sub> ) <sub>2</sub> (aq) is m	ixed with a	4)
solution of KI(a	~	V+ 1 NO			
	<del>-</del>	m; K <sup>+</sup> and NO <sub>3</sub> - a ill form; K+ and I-	~		
	•	orm; Pb <sup>2+</sup> and I <sup>-</sup> a	_		
• •		m; Pb <sup>2+</sup> and I <sup>-</sup> are	-		
E) No precipit			Î		
5) In solutions A) The solute is	always a solid and	the solvent is always	a liquid.		5)
•	is the solution comp	•	the smallest compone to the largest compone		
6) Which one of the aqueous solution.	following will show	strong electrical sign	al when electrodes are	placed in an	6)
A) strong electr C) none of the a			veak electrolyte on electrolyte		
-,					

assuming complete	40	st number of marvior	iai particies ni an aq	ueous sommon	//
A) none of the a		B) N	a Cl		
C) Mg Cl <sub>2</sub>		D) Li	Cl		
8) Give the name for	H <sub>2</sub> SO <sub>4</sub> .				8)
A) persulfuric a	cid				
B) hyposulfuror	us acid				
C) sulfuric acid					
D) sulfurous aci					
E) persulfurous	acid				
9) The empirical fo	rmula of a compo	ound of uranium and	d fluorine that is c	omposed of	9)
67.6% uranium a	and 32.4% fluorin	ne is			
A) UF4.	B) UF <sub>6</sub> .	C) U <sub>3</sub> F <sub>4</sub> .	D) UF <sub>8</sub> .	E) U <sub>2</sub> F.	

1. a. Balance the following reaction by filling in the blank for the missing coefficient. (15 pts, 5 pts per blank)

 $2 \text{ Na N}_3 (s) \rightarrow Na (s) + N_2 (g)$ 

b. Show the number of each of the elements on the reactant and product side of the above reaction which you just balanced. (5 pts)

2. Is Pb SO<sub>4</sub> [ (soluble) or (insoluble) ] (circle one) in water? Explain using where the parts of the compound show up in the solubilities rules table. (8 pts)

3. If you dissolve Na<sub>2</sub> SO<sub>4</sub> in water write out the product. The equation does not need to be balanced. (10 pts, 5 pts per blank)

 $Na_2 SO_4 (s) \rightarrow \underline{\qquad} (aq) + \underline{\qquad} (aq)$ 

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4	If you have a compound made up of 40.92 % C, 4.58% H and 54.50 % O by mass,	in 100 grams	of the compound,
(10	pts, 5 pts each letter)		

If you do a reaction given below and then do a calculation and find that: (9 pts)

$$4 \text{ NH}_3 (g) + 5 \text{ O}_2 (g) \rightarrow 4 \text{ NO } (g) + 6 \text{ H}_2 \text{ O} (g)$$

89.2 moles of NO is generated from the amount of  $NH_3$  40.8 moles of NO is generated from the amount of  $O_2$ 

Which is the limiting reagent? [(NH<sub>3</sub>) or (O<sub>2</sub>)] (circle one).

Dr. Hahn General Chemistry I Lecture Exam II Fall 2017 9am class page

1. Given the following reaction, if you want to make 5.23 grams of NO (g), how many grams of water will be generated. (MW of NO = 30.01 g/mol) (MW of H<sub>2</sub>O = 18.02 g/mol) (show work) (15 pts)

$$4 \text{ NH}_3 (g) + 5 \text{ O}_2 (g) \rightarrow 4 \text{ NO } (g) + 6 \text{ H}_2 \text{ O } (g)$$

Dr. Hahn General Chemistry I Lecture Exam II

3 Na OH (aq) + Al Cl<sub>3</sub> (aq)  $\rightarrow$  Al (OH)<sub>3</sub> (s) + 3 Na Cl (aq)

(a) Write the complete ionic reaction.

(b) Write the net ionic reaction.

(c) What are the spectator ions? List the spectator ions.

<b>5.</b>	14H 2017 7/20/17	Monday 10 am Cla	ss Exam II Dr. Hah	ut Exam "	
Name		(print) Name			(sign)
Please show work for partial of Multiple choice questions have continue on the empty back p or cannot read it, I obviously	re no partial credit.  pages but clearly la  cannot grade it). R	Please write anyth bel where the remain eturn your entire exa	ing you want graded ing answer can be fo m including the per	l legibly. If you 1 ound. (If I can't fin	un out of space,
exam pages and make sure th	ere are real pag	ges + periodic table as	ssembly)		
It is your responsibility to retinto Dr. Hahn's hands. If yo that exam will count as an U	u do not and the ex	am disappears or si			
MULTIPLE CHOICE. Choos 32 pts total)	se the one alternati	ve that best complete	es the statement or a	nswers the questi	on. (2 pts each,
1) A limiting reagent	is				1)
•	ou run out of first	•	one of the above		
C) the reactant y	ou run out of last	D) th	e limited product an	nount	
Which one of the for aqueous solution.	ollowing will show	strong electrical signa	al when electrodes ar	re placed in an	2)
		<b>T</b> )			
A) non electroly: C) weak electrol			rong electrolyte one of the above		
B) (A) and (B) ar C) The solute is	re correct. the solution compo	the solvent is always nent which makes up onent which makes u	the smallest compo		3)n.
4) The empirical for	rmula of a compound 32.4% fluorin		d fluorine that is co	omposed of	4)
A) UF <sub>4</sub> .	B) UF <sub>6</sub> .	C) U <sub>3</sub> F <sub>4</sub> .	D) U <sub>2</sub> F.	E) UF <sub>8</sub> .	
5) Based on the solution water?	ubility rules, whic	ch one of the follow	ving compounds sh	ould be <i>insolub</i>	le 5)
A) AgBr	B) FeCl <sub>2</sub>	C) ZnCl <sub>2</sub>	D) NaCl	E) MgBr <sub>2</sub>	
6) Give the name for A) nitric acid B) hydrogen nit C) hydrogen nit D) hydrogen nit E) nitrous acid	ride rate				6)

Exam II

Fall 2017

10 am. class page 1

Dr. Hahn General Chemistry I Lecture

7) What percent by mass of oxygen i	s present in carbon monoxide, CO? [MW (CO)=28.01	7)
g/mol]		
A) 57%		
B) 60. %		
C) None of the above		
D) 59 %		
E) 58%		
8) Which of the following gives the large	est number of individual particles in an aqueous solution	8)
assuming complete dissociation?		
A) none of the above	B) Na Cl	
C) Li Cl	D) Mg Cl <sub>2</sub>	
9) Which of the following will occur	when a solution of Pb(NO <sub>3</sub> ) <sub>2</sub> (aq) is mixed with a	9)
solution of Kl(aq)?		
A) A precipitate of KNO <sub>3</sub> will f	form; Pb <sup>2+</sup> and I <sup>-</sup> are spectator ions.	
B) A precipitate of PbI <sub>2</sub> will for	m; K <sup>+</sup> and NO <sub>3</sub> <sup>-</sup> are spectator ions.	
C) A precipitate of PbI2 will for	m; Pb <sup>2+</sup> and I <sup>-</sup> are spectator ions.	
D) No precipitate will form.		
E) A precipitate of Pb(NO <sub>3</sub> ) <sub>2</sub> w	ill form: K <sup>+</sup> and I <sup>-</sup> are spectator ions.	

1. a. Balance the following reaction by filling in the blank for the missing coefficient. (15 pts, 5 pts per blank)

 $2 \text{ K Cl O}_3 (s) \rightarrow \underline{\hspace{1cm}} \text{ K Cl (s)} + \underline{\hspace{1cm}} \text{ O}_2 (g)$ 

Show the number of each of the elements on the reactant and product side of the above b. reaction which you just balanced. (5 pts)

Na<sub>3</sub> PO<sub>4</sub> [ (soluble) or (insoluble) ] (circle one) in water? Explain using the where the parts of the compound show up in the solubilities rules table. (8 pts)

3. If you dissolve Al (NO<sub>3</sub>)<sub>3</sub> in water write out the product The equation does not need to be balanced. (10 pts, 5 pts per blank.)

Al  $(NO_3)_3$  (s)  $\rightarrow$  \_\_\_\_\_ (aq) + \_\_\_\_ (aq)

4	f you have a compound made up of 40.92 % C, 4.58% H and 54.50 % O by mass, in 100 grams of the compound
(10	ots, 5 pts each letter)

- (a) how many grams of C do you have? \_\_\_\_\_ grams C in 100 grams of compound
- (b) how many moles of C do you have? (show work)

5 If you do a reaction given below and then do a calculation and find that: (9 pts)

$$8 H_2 S(g) + 4 O_2(g) \rightarrow S_8(l) + 8 H_2 O(g)$$

- 40.8 moles of  $S_8$  is generated from the amount of  $H_2\,S$
- 89.2 moles of S<sub>8</sub> is generated from the amount of O<sub>2</sub>

Which is the limiting reagent?  $[(H_2S) \text{ or } (O_2)]$  (circle one)

1. Given the following reaction, if you want to make 12.7 grams of  $S_8$ , how many grams of  $H_2S$  do you need? (MW of  $S_8 = 256.56$  g/mol) (MW of  $H_2S = 34.09$  g/mol) (show work) (15 pts)

Mg Cl<sub>2</sub> (aq) + Na<sub>2</sub> CO<sub>3</sub> (aq)  $\rightarrow$  Mg CO<sub>3</sub> (s) + 2 Na Cl (aq)

(a) Write the complete ionic reaction.

- (b) Write the net ionic reaction.
- (c) What are the spectator ions? List the spectator ions.