Exam 4A
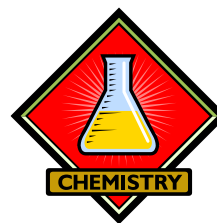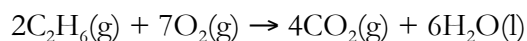# Chem 1121
Fall 2013

Name:_____

SHORT RESPONSE. Show your work (where appropriate) to receive full credit. Use the conversion factor method for all conversion problems!

Q1. [15 pts.] Given the balanced chemical equation:

$$2C_2H_6(g) + 7O_2(g) \rightarrow 4CO_2(g) + 6H_2O(l)$$

a) How many **moles** of H_2O can be formed when 1.40 mol of O_2 reacts?

b) How many **grams** of H_2O can be formed when 2.19 mol of O_2 reacts?

c) How many **grams** of H_2O can be formed when 43.0 g of O_2 reacts?

d) If 20.1 g of H_2O are actually formed in part c, what is the **percent yield** of this reaction?

Q2. [15 pts.] Explain the three steps that happen when an ionic compound such as NaCl dissolves in water. Draw a picture of the process as part of your answer.

Step 1.
Name:_____

Step 2.
Name:_____

Step 3.
Name:_____

Q3. [10 pts.] Define the following solution terms:

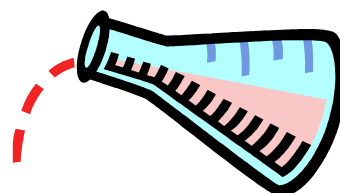   a) solute   _____

      b) aqueous   _____

      c) saturated _____

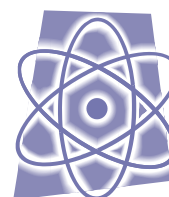   d) concentrated_____

      e) unsaturated_____

Q4. [10 pts.] What's the molarity of a solution prepared by dissolving 12.4 g of NaF in water, until the total volume is 250. mL?

Q5. [10 pts.] How many moles of HCl are in 25.0 mL of 12.0 M HCl(aq)?

Q6. [7 pts.] What's the osmolarity of 1.5 M Na_2SO_4(aq)?

Q7. [8 pts.] What is meant by the term: "colligative property"? Give one example.

Q8. [10 pts.] What will happen if a red blood cell is placed in a hypertonic solution. Explain your answer.

Q9. [7 pts.] How many grams of solute are there in 140 mL of a 3.4 % (w/v) solution?

Q10. [8 pts.] What are the four physical quantities that we typically measure when dealing with gases? What are their symbols?

     i)   _____, whose symbol is _____

     ii)   _____, whose symbol is _____
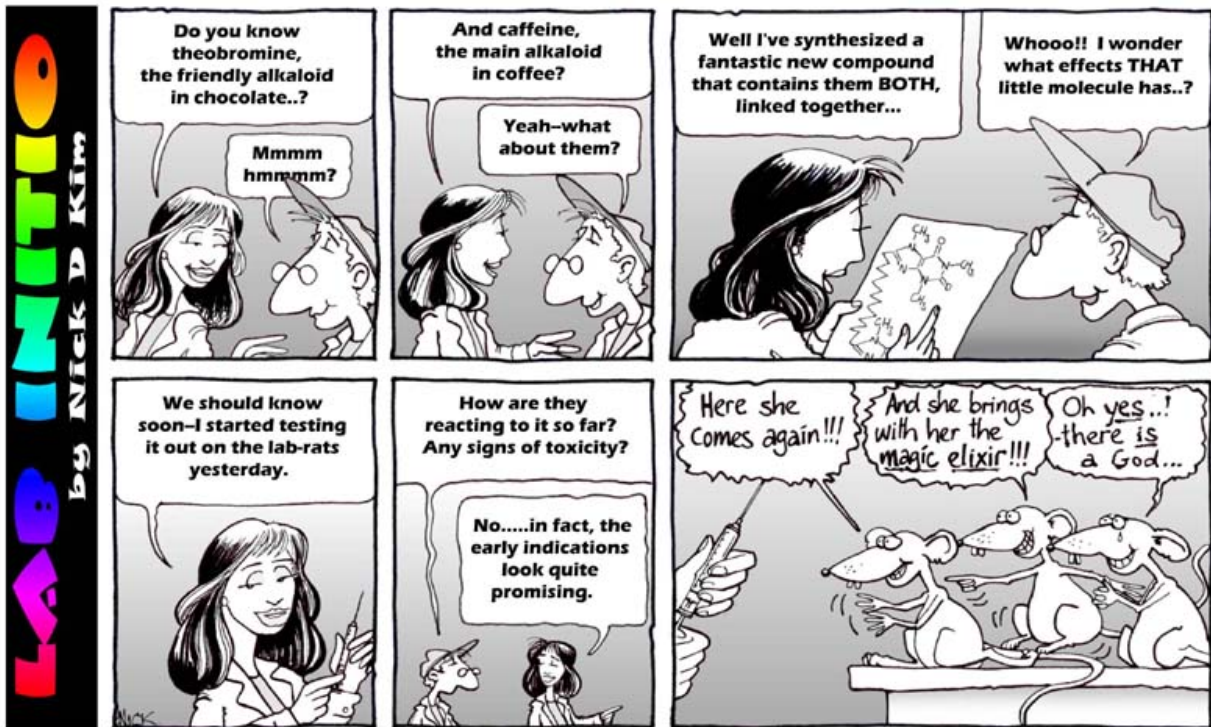
     iii)   _____, whose symbol is _____

     iv)   _____, whose symbol is _____

BONUS: What is the relationship between mmHg and atm?

Useful Information

Periodic Table of the Elements

IA	IIA											IIIA	IVA	VA	VIA	VIIA	VIIIA
1																	18
1 H 1.01	2											13	14	15	16	17	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc [98]	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba* 137.33	71 Lu 174.97	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.20	83 Bi 208.98	84 Po [210]	85 At [210]	86 Rn [222]
87 Fr [223]	88 Ra** [226]	103 Lr [262]	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [265]	109 Mt [268]	110 [269]	111 [272]	112 [277]	113	114 [285]	115	116 [289]	117	118 [293]

*	57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm [145]	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04
**	89 Ac [227]	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np [237]	94 Pu [244]	95 Am [243]	96 Cm [247]	97 Bk [247]	98 Cf [251]	99 Es [252]	100 Fm [257]	101 Md [258]	102 No [259]

Exam 4B
Chem 1121
Fall 2013

Name:_____

SHORT RESPONSE. Show your work (where appropriate) to receive full credit. Use the conversion factor method for all conversion problems!

Q1. [10 pts.] Define the following solution terms:

a) solute   _____

b) aqueous   _____

c) saturated   _____

d) concentrated_____
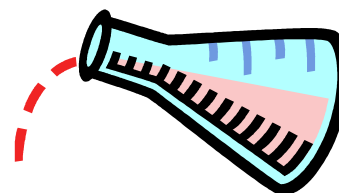
e) unsaturated_____

Q2. [8 pts.] What are the four physical quantities that we typically measure when dealing with gases? What are their symbols?

i)   _____, whose symbol is _____

ii)   _____, whose symbol is _____

iii)   _____, whose symbol is _____

iv)   _____, whose symbol is _____

Q3. [10 pts.] How many moles of HNO_3 are in 35.0 mL of 15.0 M $HNO_3(aq)$?

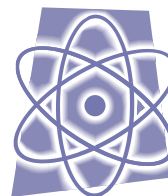Q4. [7 pts.] What's the osmolarity of 1.5 M $K_2SO_4(aq)$?

Q5. [8 pts.] What is meant by the term: "colligative property"? Give one example.

Q6. [15 pts.] Explain the three steps that happen when an ionic compound such as NaCl dissolves in water. Draw a picture of the process as part of your answer.
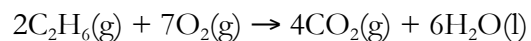
Step 1.
Name:_____

Step 2.
Name:_____

Step 3.
Name:_____

Q7. [15 pts.] Given the balanced chemical equation:

$$2C_2H_6(g) + 7O_2(g) \rightarrow 4CO_2(g) + 6H_2O(l)$$

a) How many **moles** of CO_2 can be formed when 1.40 mol of O_2 reacts?

b) How many **grams** of CO_2 can be formed when 2.19 mol of O_2 reacts?

c) How many **grams** of CO_2 can be formed when 43.0 g of O_2 reacts?

d) If 30.1 g of CO_2 are actually formed in part c, what is the **percent yield** of this reaction?

Q8. [10 pts.] What's the molarity of a solution prepared by dissolving 12.4 g of KF in water, until the total volume is 250. mL?

Q9. [10 pts.] What will happen if a red blood cell is placed in a hypotonic solution. Explain your answer.

Q10. [7 pts.] How many grams of solute are there in 140 mL of a 2.8 % (w/v) solution?

BONUS: What is the relationship between mmHg and atm?

Useful Information

Periodic Table of the Elements

IA	IIA											IIIA	IVA	VA	VIA	VIIA	VIIIA
1																	18
1 H 1.01	2											13	14	15	16	17	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc [98]	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba* 137.33	71 Lu 174.97	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.20	83 Bi 208.98	84 Po [210]	85 At [210]	86 Rn [222]
87 Fr [223]	88 Ra** [226]	103 Lr [262]	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [265]	109 Mt [268]	110 [269]	111 [272]	112 [277]	113	114 [285]	115	116 [289]	117	118 [293]

	57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm [145]	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04
*														
**	89 Ac [227]	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np [237]	94 Pu [244]	95 Am [243]	96 Cm [247]	97 Bk [247]	98 Cf [251]	99 Es [252]	100 Fm [257]	101 Md [258]	102 No [259]