REV. U7 EXAM - PART ONE FITCH ①

BE ABLE TO DEFINE:

1. – 6. - SEE GLOSSARY / APPENDICES / CH 15 IN TEXT

GENERAL QUESTIONS

1. A SUPERSATURATED SOLN CONTAINS MORE SOLUTE THAN THE SOLN SHOULD HOLD.
2. AS SOLUTION TEMPERATURE INCREASES, SOLID SOLUBILITY INCREASES.
3. AS SOLN TEMP INCREASES, GAS SOLUBILITY DECREASES

PERFORM THE FOLLOWING CALCS

1. ~150 g / 100 g H_2O
2. ~36 g / 100 g H_2O
3. $KClO_3$
4. ~42 g
5. $\frac{42\text{ g}}{100\text{ g}} = \frac{X}{67\text{ g}}$ $2814 = 100X$ $X \approx 28$ g KCl
6. $\frac{145}{100} = \frac{X}{28}$ $4060 = 100X$ $X \approx 41$ g KI

$(41\text{ g})\left(\frac{1\text{ mol}}{166.0\text{ g}}\right) = .247\text{ mol KI}$

39.1
26.9
166.0

7. $\frac{33}{100} = \frac{X}{50}$ $X = 16.5$ g KCl in 50 g H_2O TO SATURATE SOLN

- HAVE 100 g, 16.5 WILL DISSOLVE 50

$100 - 16.5 = 83.5$ g WON'T DISSOLVE

REV. U7 EXAM (cont)

PART TWO

DEFINITIONS 1-6 SEE TEXT

GENERAL QUESTIONS

1. IONIC BONDS INVOLVE GAINING OR LOSING ELECTRONS AND BONDING DUE TO THE ATTRACTION NEGATIVE OR POSITIVE CHARGES. COVALENT BONDS OCCUR WHEN ELEMENTS SHARE ELECTRONS.
2. A SATURATED SOL'N IS HAS DISSOLVED AS MUCH SOLUTE AS IT POSSIBLE.
3. A NET IONIC EQTN ONLY SHOWS THE IONS INVOLVED IN PRODUCING AN INSOLUBLE PRECIPITATE.
4. S = SOLID, ℓ = LIQUID, g = GAS, aq = AQUEOUS

PERFORM THE FOLLOWING CALC'S

1. $HI \xrightarrow{H_2O} H^+ + I^-$

   $CaCl_2 \xrightarrow{H_2O} Ca^{2+} + 2Cl^-$

   $KNO_3 \xrightarrow{H_2O} K^+ + NO_3^-$

   $Ba(OH)_2 \xrightarrow{H_2O} Ba^{2+} + 2OH^-$

   $NH_4Cl \xrightarrow{H_2O} NH_4^+ + Cl^-$

   $Na_2CO_3 \xrightarrow{H_2O} Na^+ + CO_3^-$
2. SEE #1
3. $O_5(IO_3)_2$ ($O_5 = O_3^{2+}$ $IO_3 = IO_3^-$)

PART THREE

DEFNS - 1-6 - SEE TEXT

GEN. QUESTIONS

1. Molarity = $\frac{mol}{L}$ Molality $\frac{mol}{kg}$

2. 100 ml = .1 L

$(.1L)\left(.5\frac{mol}{L}\right) = .5\ mol\ NaCl$

ADD 900 ml H_2O, STILL HAVE .5 mol NaCl

3. NO, BUT THE CONCENTRATION DOES.

4. AS A SOLN IS DILUTED, MOLARITY WILL DECREASE.

CALC'S

1. $\frac{10g}{50g} \times 100 = 20\%$

2. 1.0 L $\frac{3.5\ mol}{L} = 3.5\ mol\ H_2SO_4$

2.02
+32.06
64.00
98.08

$(3.5\ mol\ H_2SO_4)\left(\frac{98.08\ g}{mol}\right) = 343.28\ g\ H_2SO_4$

3. $.5\ m = .5\frac{mol}{kg}$ & 500 ml H_2O = 500 g = .5 Kg H_2O

$\left(.5\frac{mol}{kg}\right)(.5\ kg)$ = 2.5 mol HCl in 500 ml H_2O

4. $M_1V_1 = M_2V_2$ $M_1 = 3.0\ M$ $V_1 = 2.25\ L$ $V_2 = 5.75\ L$ $M_2 = ?$

$\frac{M_1V_1}{V_2} = M_2 = \frac{(3.0\ M)(2.25\ L)}{(5.75\ L)} = 1.17\ M = M_2$

REV CH 7 EXAM (cont)

PART 3 (cont)

5. 16 M HNO_3 = M_1 .75 L = V_2 .5 M = M_2

$V_1 = \frac{M_2 V_2}{M_1} = \frac{(.5\ M)(.75\ L)}{16\ M}$ = .023 L = V_1

23 mL = V_1

PROBLEMS

1. 126 g NaCl . 84/9. L SOLN = ? M

$(126\ g)\left(\frac{1\ mol}{58.44\ g}\right) = 2.16\ mol\ NaCl$

$\frac{2.16\ mol}{.84/9\ L} = 2.54\ M$

2. .3 L .01 M NaI

$(.3\ L)\left(\frac{.01\ mol}{L}\right) = .003\ mol\ NaI$

$(.003\ mol\ NaI)\left(\frac{149.89\ g}{1\ mol}\right) = .4496\ g\ NaI$

ADD 0.45 g NaI TO .3 L H_2O

3. $M_1 V_1 = M_2 V_2$ M_1 = .01 M V_1 = .3 L M_2 = .005 M

V_2 = ? $\frac{M_1 V_1}{M_2} = V_2$

$\frac{(.01\ M)(.3\ L)}{(.005\ M)} = V_2 = .6$

- ADD ENOUGH H_2O TO THE ABOVE SOL'N (FROM #2) TO MAKE .6 L OF SOL'N (.3 L)

REV U7 EXAM (CONT)
PART 3
PROBLEMS (CON'T)

4. .04 L OF 0.15 M NaCl + 0.065 L OF 0.19 M NaCl

$(.04\,L)\left(.15\ \frac{mol}{L}\right) = 0.006\ mol\ NaCl$

$(.065\,L)\left(.19\ \frac{mol}{L}\right) = 0.012\ mol\ NaCl$

$.006\ mol + .012\ mol = .019\ mol\ NaCl$ IN
$.04\,L + .065\,L = .105\,L$

$\frac{.019\ mol}{.105\,L} = (.17\,M)$

5. $\frac{.019\ mol}{.105\ Kg} = (.17\ m)$

6. SOLUTION = SOLUTE + SOLVENT
7. AIR IS A SOLUTION OF GASES (THERE ARE MANY OTHERS)
8. BOOZE IS ALCOHOL DISSOLVED IN H_2O (80 PROOF = 40% ETHANOL & 60% H_2O)
9. SODA POP = CO_2 IN H_2O
10. BRASS = ZINC & COPPER DISSOLVED IN EACH OTHER
11. WATER'S POLAR + & - ENDS WILL ATTRACT THE - & + IONS OF THE SALT MOLECULES, CAUSING THE SALT TO DISSOLVE. CCl_4 HAS NO CHARGES TO ATTRACT THE IONS SO IT WON'T DISSOLVE THE SALT.
12. HEAT, STIRRING, SOLUTE PARTICLE SIZE

REV U7 EXAM (cont)

PART 3

PRACTICE (cont)

13. SILVER IONIC EQTNS

$Na_2S(aq) + Pb(NO_3)_2(aq) \rightarrow PbS(s) + 2NaNO_3(aq)$

$Ca(OH)_2(aq) + NaI(aq) \rightarrow Ca^{2+}(aq) + 2OH^-(aq) + Na^+(aq) + I^-(aq)$

$NH_4C_2H_3O_2(aq) + AgNO_3(aq) \rightarrow NH_4^+(aq) + NO_3^-(aq) + AgC_2H_3O_2(s)$

$2Ca_3PO_4(aq) + 3Ca(NO_3)_2(aq) \rightarrow 6Ca^{2+}(aq) + 6NO_3^-(aq) + Ca_3(PO_4)_2(s)$

$2NaI(aq) + H_2SO_4(aq) \rightarrow 2Na^+(aq) + SO_4^{2-}(aq) + H_2I_2(s)$

14. AS TEMP. INC., SOLID SOLUBILITY INCREASES
AS TEMP INC. GAS SOLUBILITY DECREASES

18. DISSOCIATION = DISSOLUTION = DISSOLVING
PRECIPITATION = FORMATION OF A SOLID USU. IN A SOLUTION

19. A SATURATED SOLN CONTAINS AS MUCH SOLUTE AS IT CAN HOLD AT A GIVEN TEMP & PRESSURE.
AN UNSATURATED SOLN HAS LESS SOLUTE THAN IT CAN HOLD.
A SUPERSATURATED SOLN IS HOLDING MORE SOLUTE THAN IT SHOULD BE ABLE TO HOLD

20. .05 mol NH_4Cl & .0025 M SOL'N

$\frac{(.05\ mol)(L)}{(.0025\ mol)} = \frac{.05\ mol}{\frac{.0025\ mol}{L}} =$ 20 L H_2O

21. $M_1V_1 = M_2V_2$ $V_1 = .002$ L $M_1 = 10.0$ M $V_2 = ?$ $M_2 = .005$ M

$\frac{M_1V_1}{M_2} = V_2 = \frac{(10.0\ M)(.002\ L)}{.005\ M} = 4$ L — DON'T HAVE THAT MUCH H_2O

$(.005\ \frac{mol}{L})(.05\ L) = .0025$ mol NaOH in .05 L

$(.002\ L)(10\ \frac{mol}{L}) = .02$ mol NaOH in .002 L

$M_1V_1 = M_2V_2$ $M_1 = .005\ \frac{mol}{L}$ $V_1 = .05$ L $M_2 = 10\ \frac{mol}{L}$ $V_2 = ?$

$\frac{(.005\ M)(.05\ L)}{10\ M} = V_2$

$V_2 = .000025$ L $= .025$ ml

- 50. ml X .025 ml OF 10 M SOL'N (W) ENOUGH H_2O TO MAKE 50 ml OF SOL'N TO MAKE 50 ml OF .005 M NaOH SOL'N

22. 3.5 M 2L $AgCl$ = 143.32 g/mol

107.87
35.45
143.32

$(\frac{3.5\ mol}{L})(2\ L) = 7$ mol $AgCl$

$(7\ mol\ AgCl)(143.32\ g) = 1003.24$ g

+ DISSOLVE 1.00324 Kg $AgCl$ IN 2 L H_2O