Name:
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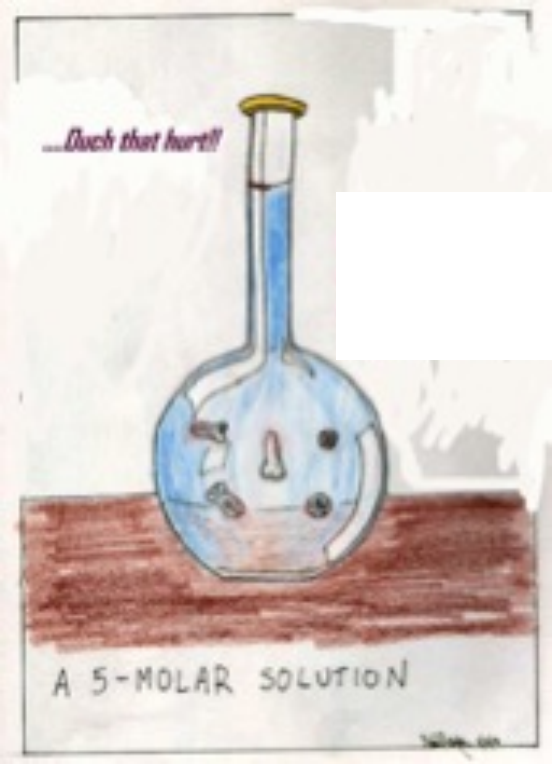
SCH3U

Teacher: C. Halupka

Unit Test-4:

"Solution and Solubility"

Multiple choice =	**/8**
Fill in the blank =	**/7**
What if Scenarios =	**/7**
Short answer =	**/28**
Total:	**/50**



A: Multiple Choice: Put your answers in the boxes below.

/8	1.	2.	3.	4.	5.	6.	7.	8.

1. **Acids** have a lot of these floating around?
   a. Hydrogens b) Hydrogen Ions c) Hydroxide Ions d) Any Negative ions

2. **Bases** have lots of these floating around?
   a. Hydrogens b) Hydrogen Ions c) Hydroxide Ions d) None of these

3. **Acids** have a pH in the range of?
   a. pH=7 b) pH = 0-6.9 c) pH = 0-14 d) pH = 7.1-14

4. **Bronstead Lowery theory** states that **bases** are?
   a. Any substance that can accept an OH^{-1} ion.
   b. Any substance that gives off an H^{+1} ion.
   c. Any substance that gives off an OH^{-1} ion
   d. Any substance that can accept an H^{+} ion

5. An **acid** and a **base** mixed together make?
   a. Water and hydrogen gas b) Water c) NaCl d) Salt and water

6. Which of the following chemicals would be considered a **strong Base**?
   a. CH_4
   b. HOH
   c. HCl
   d. $Mg(OH)_2$

7. **Acids** have many different names….which of the following is **INCORRECRT?**
   a. Proton
   b. Hydronium ion
   c. Hydrogen gas
   d. Hydrogen ion

8. The **Liquid portion** that a solid is dissolved in is called the…?
   a. Solute
   b. Solvent
   c. Water
   d. Solution

9. Fill in the blank test:

Put your answer on the line provided. **(Total= /7)**

a) _____The name of the glassware apparatus that chemicals (solid or liquid) are added to then filled with water to the proper mark to make an accurate solution?

b) _____A 6L sol'n of water has 3mols of CO_2 in it, If 12L of water are added to the solution then, How many moles are in the new solution?

c) _____Find the concentration of the Cation in 1.5 M of $BaCl_2$. (pg 448 Q1)

d) _____When doing a titration, name the glassware used to determine the volume of a know concentration used to neutralization a sample?

e) _____The name of the glassware used to suck up accurately a certain amount of liquid from a stock solution?

f) _____Calculate the **pH** of a solution of Vinegar where the Hydrogen ion concentration is **7.9×10^{-9} mol/L (2 marks)**

10. What if Scenarios…Fill in the blank:

Fill in the blanks with the words INCREASE or DECREASE or NOTHING for the following sentences below **(Total= /7)**

a. _____What would happen to your %v/v of your vinegar sample solution if you unknowingly made the titration solution of NaOH stronger than it should have been.

b. _____Your sample was still wet in the filter in your % yield lab, the % yield would?

c. _____You added more excess chemical in your % yield lab. The % yield would?

d. _____You added more limiting chemical in your % yield lab. The % yield would?

e. _____If your titrated acid sample was too pink then how would that affect your %v/v?

f. _____Water was used to wash down the sides of an Erlenmeyer sample flask during a titration.

g. _____If accidentally/ unknowingly added extra vinegar to your vinegar sample during a titration??

Short Answer: (Show work for full marks)

1. If 775 ml of a 3M solution of $CaCl_2$ was added to 500mL of a 4M solution of $AgNO_3$ then how much **AgCl** should be made? **(Total= /4)**

$$\underset{\textbf{(110.98g/mol)}}{CaCl_2} + \underset{\textbf{(169.87g/mol)}}{2AgNO_3} \longrightarrow \underset{\textbf{(143.32 g/mol)}}{2AgCl} + \underset{\textbf{(164.08g/mol)}}{Ca(NO_3)_2}$$

2. Fructose $C_6H_{12}O_6$ is a natural sugar in apple juice. A person with diabetes must be aware of the quantity of sugar she consumes. The amount concentration of fructose in a certain brand of apple juice is 0.67 mol/L. What mass of fructose is present in a 250ml bottle of apple juice? (pg401 Q3) **(Total= /3)**

3. A 250ml sample of tap water is found to contain 12 ppb of an antibiotic. Determine the mass of the antibiotic in the sample. (pg 410 Q3) **(Total= /3)**

4. Titration: Use the data below to determine the mol/L then the %v/v of acetic acid (CH_3COOH) in a sample of vinegar Reinhardt's vinegar.

$$2CH_3COOH(aq) + Ca(OH)_2(l) \text{ <---------> } 2H\text{-}OH(l) + Ca(CH_3COO)_2(aq)$$

$[Ca(OH)_2]$ titration solution = 6M
Final reading on burette= 20 ml
Initial reading on burette = 5 ml
Volume of Acetic acid sample = 35mls
Density of H_2O= 1.0 g/ml
Density of $CH_3COOH(l)$= 1.045 g/ml
Density of $Ca(OH)_2$ = 1.6 g/ml
Density $Ca(CH_3COOH)_2$ =2.21 g/ml
Molar mass of $Ca(OH)_2$ = 74.09 g/mol
Molar mass of CH_3COOH= 60.06 g/mol
Molar mass $Ca(CH_3COOH)_2$ = 158.16 g/mol
Mass of acetic acid sample and flask = 153g

(Mol/L) Acetic Acid in Sample =_____**(Total= /5)**

(%v/v) Acetic Acid in sample= _____**(Total= /3)**

5. 

A saline drip bag used by patients in hospitals have a sodium chloride **concentration of 0.145 mol/L.** If the patient requires **2000ml** of the salt solution, then **calculate** how you would make the solution using the starting materials below. (making from a solid? Liquid?)

Method#1:

a. **A 2kg jar containing pure NaCl solid salt crushed into powder.** **(Total= /3)**

Calculations:

Method#2:

b. **A 5L stock solution of 6M NaCl** **(Total= /3)**

Calculations:

6. If you mixed 0.398g of $Ca(OH)_2$ (Molar mass=74.09g/mol) in 250ml of water then what would the **pH** be assuming all the base is strong? **(4)**

Equations and Data

- ppm = (mass of solute / mass of solution) $x10^6$
- ppb = (mass of solute / mass of solution) $x10^9$

- C= (V_{solute} / $V_{sol'n}$) x 100%
- C= ($Mass(g)_{Solute}$ / $V(ml)_{sol'n}$) x 100%
- C= mol/L

- 1mole = 6.02×10^{23}
- 1nanogram= 10^{-9}g
- 1mmol= 10^{-3}mol
- 1g water =1ml water @ regular room temp

- density= mass/volume

- pH + pOH = 14
- pH = $-\log[H^+]$
- pOH= $-\log[OH^-]$