Quiz 1

Name : دعاء خالد ابراهيم أبوجامع

Reg. No.:

$\frac{10}{10}$

Consider the following dehydration reaction:

$$MSO_4 \cdot XH_2O_{(s)} \xrightarrow{\Delta} MSO_{4\,(s)} + XH_2O_{(g)}$$

58.71 + 32

A student takes 0.943 g of the above hydrated salt and heats it in crucible. The anhydrous material weighed 0.596 g. The value of (x) in the above formula of the hydrated salt is ??

[Molar mass: M = 58.71 g/mol, S = 32.06 g/mol, O = 16.0 g/mol, H = 1.0 g/mol]

mass of water = mass of hydrated salt − mass of anhydrous

0.943 − 0.596

= 0.347 g

mole of water = $\frac{\text{mass of water}}{\text{molar mass } H_2O} = \frac{0.347}{18.0} = 0.0193$ mol

moles of anhydrous material = $\frac{\text{mass}}{\text{molar mass}} = \frac{0.596}{154.87} = 3.85 \times 10^{-3}$ mol

$X = \frac{\text{\# mole of water}}{\text{\# mole of anhydrous}} = \frac{0.0193}{3.85 \times 10^{-3}} = 5.01 \simeq 5$

Quiz 2

8/10

good

Name : دعاء خالد ابراهيم ابو حامو

Reg. no. :

when 0.384 g of phosphorus is burned, 0.880 g of white oxide is obtained. Determine the empirical formula of the oxide and mass percent of P in the oxide [Molar masses (g/mol); O: 16.00, P: 30.97].

~~P_2O_5~~

$0.384\ g\ P \times \frac{1\ mol\ P}{31.0\ g\ P} = 0.0124\ mol\ P$

mass of O_2 = 0.880 − 0.384 = 0.496 g

$0.496\ g\ H_2O \times \frac{1\ mol\ H_2O}{18.0\ g\ H_2O} = 0.0276\ mol\ H_2O$

P: $\frac{0.0124}{0.0124}$; O: $\frac{0.0276}{0.0124}$

1 : 2.3 ⇒ PO_2

1 : 2

3

A sample containing 18.1 g of NH_3 is reacted with 90.4 g of CuO to produce nitrogen gas according to this eqn balance $2NH_{3g} + 3CuO_s \rightarrow N_{2g} + 3Cu_s + 3H_2O_g$

1. which is the limiting reactant. 2. how many grams of N_2 will be form

1) $18.1\ g\ NH_3 \times \frac{1\ mol\ NH_3}{17.03\ g\ NH_3} \times \frac{1\ mol\ N_2}{2\ mol\ NH_3} = 0.531\ mol\ N_2$

$90.4\ g\ CuO \times \frac{1\ mol\ CuO}{79.55\ g\ CuO} \times \frac{1\ mol\ N_2}{3\ mol\ CuO} = 0.379\ mol\ N_2$ ⇒ CuO is the limiting reactant

2) $0.379\ mol\ N_2 \times \frac{28.09\ N_2}{1\ mol\ N_2} = 10.612\ g\ N_2$.

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why we heated the crucible strongly, after added 10 drops water? Give three reasons.

So that water H_2O reacts with the powder to release ~~MgO~~ Mg_3N_2 and remain only MgO.

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University of Jordan
Chemistry 109

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Quiz 3

Name in Arabic: حاد خالد ابراهيم ابو طاهر Date: 6/11/2007

1) If the concentration of acetic acid in vinegar is 6.0 g/L, and you took 20.0 ml of acetic acid to be titrated with 0.20M NaOH, find the volume (In ml) of NaOH needed for complete titration. (Molar Mass of acetic Acid= 60.0g/mol).

(1) $6.0 \frac{g}{L} = \frac{mass}{volume}$

$6.0 = \frac{mass}{20.0 ml}$

mass = 120 g

(2) $120 g\ CH_3COOH \times \frac{1 mol\ CH_3COOH}{60.09 g\ CH_3COOH} = 2 mol\ CH_3COOH$

(3) # mols of NaOH = 2 mol

$M = \frac{\#mols}{V}$

$0.20 = \frac{2}{V} \Rightarrow V = 10 ml\ NaOH$

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2) If you wish to prepare 250 ml of a 0.10 M of reagent from a 1.50 M solution, how much of the latter solution would you use?

$M_1 \times V_1 = M_2 \times V_2$

$0.10 \frac{mol}{ml} \times 250 ml = 1.50 \times V_2$

$V_2 = \frac{0.10 \times 250}{1.50} = 17 ml$ (2 significant figures)

4

3) What are the oxidizing agents and reducing agents in today experiment? Give one example.

zero

Name: دعاء خالد ابراهيم أبو طه Quiz # 4

Reg. No: 0076915

10/10 good

Thermochemistry

A sample of 0.40 g (mass) of ZnO (molar mass = 81.0 g/mol) was reacted with 100.0 g (mass) of 0.50 M HCl solution.

given the following data:

initial temperature of solution = 22.0 °C

final temperature = 25.2 °C $\Delta t = 3.2$

heat capacity of the breaker = 55.0 J/°C

specific heat of the solution = 4.07 J/g.°C

calculate ΔH for the reaction (in kJ/mol ZnO)

$ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$

$\Delta H_{rxn} = \Delta H_{solution} + \Delta H_{breker}$

$= m s \Delta t_{solution} + C \Delta t$

$= 100.40 g \times 4.07 \frac{J}{g \cdot °C} \times (\underbrace{25.2 - 22.0}_{3.2}) °C + 55.0 \frac{J}{°C} \times (\underbrace{25.2 - 22.0}_{3.2}) °C$

$= 1307.6 J + 176 = 1483.6 = 1.484$ ~~kJ/mol ZnO~~

mols of ZnO $= \frac{0.40 g ZnO}{81.0 g/mol} = 4.94 \times 10^{-3}$ mol ZnO

Given that: $\Delta H/mol\ ZnO = \frac{1.484 kJ}{4.94 \times 10^{-3} mol\ ZnO} = 300.4$ kJ/mol ZnO

$NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$ $\Delta H = -57.3$ kJ/mol

$NH_{3(aq)} + HCl_{(aq)} \rightarrow NH_4Cl_{(aq)}$ $\Delta H = -86.9$ kJ/mol

Calculate ΔH for the reaction

$NaOH_{(aq)} + NH_4Cl_{(aq)} \rightarrow NH_{3(aq)} + NaCl_{(aq)} + H_2O$

$NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$ $\Delta H = -57.3$ kJ/mol

(-) $NH_4Cl_{(aq)} \rightarrow HCl_{(aq)} + NH_{3(aq)}$ $\Delta H = 86.9$ kJ/mol

$NaOH_{(aq)} + NH_4Cl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O + NH_{3(aq)}$ $\Delta H = 29.6$ kJ/mol

The University of Jordan Chemistry Department General Chemistry Lab 333109 Student ID No.:.....		Quiz 4 Date: 07.11.2007 Time: 10 min اسم الطالب:.....

2061433

Q1) Given the following data:

- Mass of antacid tablet containing the active ingredient of $Al(OH)_3$ = 0.75 g
- Volume of 0.17 M HCl solution used to dissolve the sample = 60.0 mL
- Volume of 0.10 M NaOH solution needed to titrate the excess acid = 15.00 mL
- Molar mass of $Al(OH)_3$ = 78.0 g / mol

Calculate the mass percent of $Al(OH)_3$ in the tablet.

$Al(OH)_3$ = 0.75g

HCl M = 0.17 V = 60ml

$NaOH + HCl \rightarrow NaCl + H_2O$

$n_{HCl} = MV = 0.17 \times 60.0 = 10.2 \times 10^{-3}$ mol

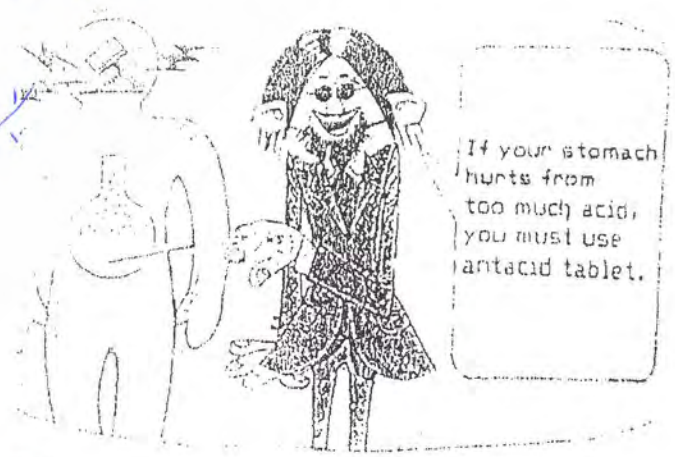
$n_{NaOH} = 0.10 \times 15 = 1.5$ mol $\times 10^{-3}$

$n_{Al(OH)_3} = \frac{0.75}{0.17} = 4.41$ mol

$n = 4.41 - 1.5 = 2.94$

mass = $2.94 \times 78 = 229.32$

mass% = $\frac{75}{229.32} \times 100\%$



Q2) In today's experiment, vitamin (C) **is used as an indicator, and it will change its color from** non colur **to** blue **at the endpoint.**

University of Jordan
Department of Chemistry

Chemistry 109
Quiz

6.7

Name: Rana yousef Al.Madi

1) Given the following set of data for $FeCl_3.xH_2O$

- Mass of the empty crucible = 13.45 g
- Mass of the empty crucible and hydrated salt = 14.90 g
- Mass of the empty crucible and anhydrous salt after heating = 14.05 g
- Molar mass of anhydrous salt 162.5 g / mol

Calculate the value x in $FeCl_3.xH_2O$

Mass of anhydrous salt = 14.05 - 13.45 = 0.6 g

Mass of hydrated salt = 14.90 - 13.45 = 1.45 g

mole of anhydrous = $\frac{0.6}{162.5}$ = 0.00369231 mole

Mass of water = 1.45 - 0.6 = 0.85 g

Mole of water = $\frac{0.85}{18}$ = 0.047222

X = 12.7 ⇒ X ≈ 13

2) During the alum experiment, if all the water had not been driven of, the calculated value x in $KAl(SO_4)_2.XH_2O$ will be (less than actual, more than actual, not affected)

EXPLAIN YOUR ANSWER

If all water had been driven the number of X it will be ~~too~~ very small but if all

Quiz لابوكيمياء

2 Formula of a Hydrate

8

Name: .....[illegible]..... Section .....

Results and Calculations

A. Potassium Alum:

Mass of empty crucible	22.70 g
Mass of crucible and the alum	23.79 g
Mass of crucible and anhydrous salt	23.27 g
Mass of alum	1.09 g
Mass of anhydrous salt	0.57 g
Mass of water lost upon heating	0.52 g
Number of moles of water lost upon heating (molar mass =18.0 g/mol)	0.029 mol
Number of moles of anhydrous salt ($KAl(SO_4)_2$) molar mass = 258 g/mol	0.0022 mol
Percentage of water of crystallization, by mass	91.2 %
The value "x" in the formula, (number of moles of water of crystallization / number of moles of anhydrous salt)	13.2

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2) A student heated 1.16 g of hydrated sodium sulfate(Na_2SO_4) in a crucible to get 0.51 g of anhydrous salt(molar mass= 142 g/mol). What is the formula of the hydrated salt?

$m_1 = 1.16\,g$

$m_2 = 0.51\,g$

$m_1 - m_2 = 0.65\,g$ → mass of loss water

$\frac{0.51}{142} = 0.0036$ moles of anhydrous salt

moles of water $= \frac{0.65}{18} = 0.036$

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value of $x = \frac{0.036}{0.0036} = 10$

$\boxed{Na_2SO_4 \cdot 10H_2O}$

Quiz لاب كيمياء

Quiz 2

8/10

Name: .....حسام محمد عازم..... Section .....

Results and Calculations

$$2\ Na_3PO_{4(aq)} + 3\ BaCl_{2(aq)} \rightarrow Ba_3(PO_4)_{2(s)} + 6\ NaCl_{(aq)}$$

A. Precipitation of $Ba_3(PO_4)_2$:

Mass of salt mixture	0.76 g
Mass of filter paper	0.62 g
Mass of filter paper and $Ba_3(PO_4)_2$	0.81 g

B. Determination of the Limiting Reactant:

Limiting reactant in salt mixture is Na_3PO_4

Excess reactant in salt mixture is $BaCl_2$

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Mass of $Ba_3(PO_4)_2$ precipitated	0.190 g
Number of moles of $Ba_3(PO_4)_2$ precipitated (molar mass = 601.64 g/mol)	3.16×10^{-4} mol

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Number of moles of $Na_3PO_4 .12H_2O$ reacted	6.32×10^{-4} mol
Number of moles of $BaCl_2.2H_2O$ reacted	9.47×10^{-4} mol
Mass of $Na_3PO_4 . 12H_2O$ reacted (molar mass = 380.2 g/mol)	0.240 g
Mass of $BaCl_2.2H_2O$ reacted (molar mass = 244.2 g/mol)	0.231 g
Mass percentage of Na_3PO_4	31.58 %

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3 ⟶ 1.

2.66

2).A mixture of 0.65 g $BaCl_2 . 2H_2O$ (molar mass 244.2 g/mol) and 0.35 g $Na_3PO_4.12\ H_2O$ (molar mass 380.2 g/mol) was dissolved in water. Which of the two reactants is the limiting reactant? Calculate the mass of $Ba_3(PO_4)_2$ (molar mass 601.64 g/mol) precipitate formed.

$$3\,BaCl_2 + 2Na_3PO_4 \longrightarrow Ba_3(PO_4)_2 + 6NaCl$$

$n = \frac{.65}{244.2} = 2.66 \times 10^{-3}$

$n = \frac{0.35}{380.2} = 9.21 \times 10^{-4}$

1

$n = [\text{Given from } BaCl_2] = \frac{2.66 \times 10^{-3}}{3} = 0.887 \times 10^{-3}$ mol

$n = [\text{Given from } Na_3PO_4] = \frac{9.21 \times 10^{-4}}{2} = 4.61 \times 10^{-4}$ mol

$BaCl_2$ is the limiting Reactant.

⇒ mass of $Ba_3(PO_4)_2 = 0.887 \times 10^{-3} \times 601.64 = \boxed{0.534\ g}$ #

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Quiz لاب كيمياء

Chemistry Department Chem 109 Quiz 3

Name: حسام محمد عاتم Table: Grade: 3/10

Volumertric Analysis

Question 1

Given the following set of data:

Volume of vinegar solution= 20.00 mL

Volume of 0.15 M NaOH solution needed to neutralize acid in above vinegar solution = 18.00 mL.

Density of vinegar solution = 1.05 g/mL.

Calculate the mass percent of acetic acid(molar mass = 60.0 g/mol) in above vinegar solution.

$n = 0.18 \times 0.02 = 2.7 \times 10^{-3}$ mol = n of moles of acetic acid $\Rightarrow m = 2.7 \times 10^{-3} \times 60 = 0.162$ g

$m = 20 \times 1.05 = 21$ g

$100\% \times \frac{16.2}{21} = 77.14\%$

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Question 2

a) Given the following set of data:

Mass of antacid sample = 0.30 g

Volume of 0.12 M HCl solution added = 60.00 mL. $n_1 = 7.2 \times 10^{-3}$ mol

Volume of 0.10M NaOH solution needed for back titration = 16.00 mL. $n_2 = 1.6 \times 10^{-3}$ mol

Calculate the number of moles of HCl neutralized by 1.00 g tablet.

$n_1 - n_2 = 5.6 \times 10^{-3}$ mol

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b) Given:

Density of stomach acid is 1.10 g/mL.

Concentration of stomach HCl is 0.10 M.

Neutralization capacity of antacid is 0.030 mol H^+/g tablet.

Calculate the mass of stomach acid that can be neutralized by 1.00 g antacid tablet