Math Dawek

ثانيا (ب)

الكيمياء العامة (1)

1) Density = $\frac{\text{Mass}}{\text{Volume}}$ ≈ $\frac{g}{mL/L/cm^3}$

2) * Mass of water lost upon heating
= Mass of alum − Mass of unhydrous

→ Moles = $\frac{\text{Mass}}{\text{Molar Mass}}$

→ * percentage of water of crystalizing by Mass
= Mass of lost upon heating × 100 %

→ value of "X" = $\frac{\text{moles of water}}{\text{moles of anhydrate salt}}$

= $\frac{(\text{Mass of alum} - \text{Mass of water})}{\text{MM of unhydrous}}$

$\frac{(\text{Mass of alum} - \text{Mass of anhydrous})}{\text{MM of water}}$

3) A)

ex: ?P + ?O → P_2O_5 ← اول خطوة

Mass of white oxide (P_2O_5) − Mass of (P)
= Mass of (O_2)

→ $\frac{\text{Mass}}{\text{MM}}$ = moles of O_2 and P

empirical formula → P_nO_n
division by smalest number of moles

→ mass percent of "x" in XO (oxide)
$= \frac{\text{mass X}}{\text{mass XO}} \times 100\%$ ⇒ experimently X_1

~~percent error~~

Mass percent of Mg in MgO (calculated)

$= \frac{\text{Molar Mass of Mg}}{\text{Molar Mass of MgO}} \times 100\%$ X_2

~~Mass~~
→ percentage error $= \left[\frac{|X_2 - X_1|}{X_2}\right] \times 100\%$

*6 ① $Mg_3N_2 + 6H_2O \rightarrow 3Mg(OH)_2 + 2NH_3$ → amonia
② $3Mg(OH)_2 + \text{heat} \rightarrow 3MgO + 3H_2O$

4) * $2Na_3PO_4 + 3BaCl_2 \rightarrow Ba_3(PO_4)_2 (s) + 6NaCl$

sodium phosphate — barium cloride

* net Ionic equation :-

$$2PO_4^{-3} + 3Ba^{+2} \rightarrow Ba_3(PO_4)_2$$

→ * if we have masses → moles → الأقل هو limiting reactant

"moles" limiting reactant نحول ال ← نسبة كتلة المترسبة

→ moles of product نجيب العامل اللي بدنا نحوله من المعادلة "النسبة"

mass by $= n \times Mw$

* Mass of excess = Na...

Mass of salt Mix − (Mass of limiting + Mass of Ba...)

* Mass percentage of limiting = $\frac{\text{Mass of limiting}}{\text{Mass of salt Mix}} \times 100\%$

* test for excess of PO_4^{-3}

we add 2 drop of $BaCl_2$ solution to beaker if precipitate formes then PO_4^{-3} excess Ba limiting

* test for excess $BaCl_2$

نفس الشي

5) * $n = M * V(L)$

* $n = \frac{mass}{MM}$

→ Number of moles of base = Number of moles of acid

* the Indicator phenolphthalein, which is colorless in acid and pink in base

* we have volume and we have molarity → moles of base

molarity ← moles of acid (1:1)

mass ← moles of acid (×MM)

* Mass percent acitic acid in Vinger

$= \frac{\text{Molarity} \times MM}{10 \times \text{density}}$ %

6) * $Mg(OH)_2 + 2HCl \longrightarrow MgCl_2 + 2H_2O$

$Al(OH)_3 + 3HCl \longrightarrow AlCl_3 + 3H_2O$

* $CaCO_3 + 2HCl \longrightarrow CaCl_2 + CO_2 + H_2O$

* $NaHCO_3 + HCl \longrightarrow NaCl + CO_2 + H_2O$

* Mass of antacid sample ... g

HCl

$n_1 = V * M$

NaOH

$n_2 = V * M$ (same HCl)

used to dissolve antacid

buret reading

~~$n_{excess\ HCl} = n_1 - n_2$~~

$n_{excess\ of\ HCl} = n_2$

$n_{nut} = n_1 - n_2$

needed to nutralize antacid tablet

* Neutralizing capacity of antacid

$= \frac{n_{nut}}{\text{Mass of antacide}}$

7) $IO_3^- + 8I^- + 6H^+ \rightarrow 3I_3^- + 3H_2O$

$IO_3^- : I_3^-$

1 : 3

* $I_3^- + C_6H_8O_6 + H_2O \rightarrow C_6H_8O_7 + 3I^- + 2H^+$

1:1

* $2S_2O_3^{-2} + \text{excess } I_3^- \rightarrow 3I^- + S_4O_6^{-2}$

2:1

deep blue → colorless

⊛ mass for sample 1:3 (x3)

⊛ add, $KIO_3 \xrightarrow{1:1} K^+ + IO_3^-$ (moles of) $\xrightarrow{\text{treated with } I^-} I_3^-$ (total)

⊛ *n of $Na_2S_2O_3$ = M * V(L) → buret (F-I)

1:1

*n of excess I_3^- ← (÷2) *n of $S_2O_3^{-2}$

⊛ *n of I_3^- (Total − excess) → reduced by $C_6H_8O_6$

1:1

*n of $C_6H_8O_6$ → Mass of $C_6H_8O_6$ (x MM)

Mass percent = $\frac{\text{mass}}{\text{sample}} \times 100\%$

(I_3^-) $S_2O_3^{-2}$ starch $S_2O_3^{-2}$

red brown → pale yellow → deep blue → colorless

8) ⊛ $ClO^- + 2S_2O_3^{-2} + 2H^+ \rightarrow Cl^- + SuO_6^{-2} + H_2O$

1:2

⊛ Volume of bleach solution ~~——————~~

⊛ Volume of $Na_2S_2O_3$ solution (buret reading (F - I))

* n of ClO^- reduced ← ÷2 (1:2) * n of $Na_2S_2O_3$ ← *M

÷ volume of bleach → Molarity of diluted bleach ← * diluted factor

Molarity of original bleach

* Mass percent = $\frac{\text{Molarity original} * MM}{d * 10}$

* diluted factor = ~~diluted~~ original / diluted

Five Apple

a) gases behave ideely : ① low pressure
② High Temp
③ low Mwt

$\longrightarrow PV = nRT$

$\Rightarrow PV = \left(\frac{Mass}{MM}\right) * R * T$

P: atm
V: L
Mass: g

T: K°
MM: g/mole

tor ≡ mmHg
÷ 760
atm

10)

Heat lost = Heat gained

$q_{warm\ water} = [q_{cold\ water} + q_{cal}]$

for cold water

$(m * S * \Delta t)_{warm\ water} = [(m S \Delta t)_{cold} + (C * \Delta t)_{cal}]$

cal constant

① ✱ $NaOH + HCl \longrightarrow NaCl + H_2O$

② ✱ $NH_3 + HCl \longrightarrow NH_4Cl$

③ ✱ $NaOH + NH_4Cl \longrightarrow NaCl + NH_3 + H_2O$

A) (q_{hot}) Heat lost by hot water = $m * S * \Delta t$

(q_{cold}) = gained = cold = $= m * S * \Delta t$

(q_{cal}) Heat gained by cal water = (last − colel)

(C) constant = $\frac{\text{Heat gained by cal water}}{\Delta t \text{ for cold water}}$

B) (q_{sol}) Heat gained by Solution = $m * S * \Delta t$

(q_{cal}) = = = cal = $C * \Delta t$

Heat of the reaction = $-(q_{sol} + q_{cal})$

$\Delta H = \frac{\text{Heat of the reaction (kJ)}}{\text{\# of water} \approx \text{NaOH} \approx \text{HCl}}$

* $V + V = 2V$

* $m + m = 2m$

C) same part (B)

* to determined the third equation enthalpy (ΔH) → $NaOH + NH_4Cl \rightarrow NaCl + NH_3 + H_2O$

$\Delta H_{Third} = \Delta H_{(first)} + (-\Delta H)_{(Second)}$ "Hess's law