

~~Month
Dwork~~

U) Unit

(1) $\frac{\text{Mass}}{\text{Volume}}$

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

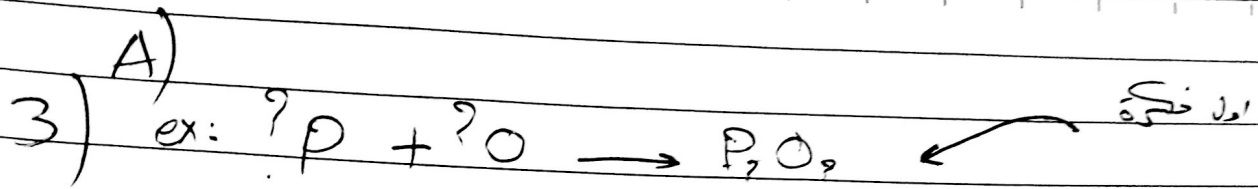
$$2) * \text{ Mass of water lost upon heating} \\ = \text{Mass of alum} - \text{Mass of anhydrous}$$

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

$$* \rightarrow \text{percentage of water of crystallizing by Mass} \\ = \frac{\text{Mass of lost upon heating}}{\text{Mass of alum}} \times 100\%$$

$$\rightarrow \text{value of "X"} = \frac{\text{moles of water}}{\text{moles of anhydrous salt}} \\ = \frac{(\text{Mass of alum} - \text{Mass of water})}{\text{MM of anhydrous}}$$

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



$$\text{Mass of white oxide (P}_2\text{O}_5) - \text{Mass of (P)} \\ = \text{Mass of (O}_2\text{)}$$

$$\rightarrow \frac{\text{Mass}}{\text{MM}} = \text{moles of O}_2 \text{ and P}$$

empirical formula $\rightarrow P_nO_m$
division by smallest number of moles

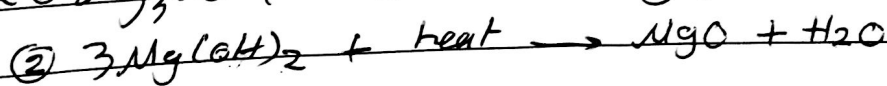
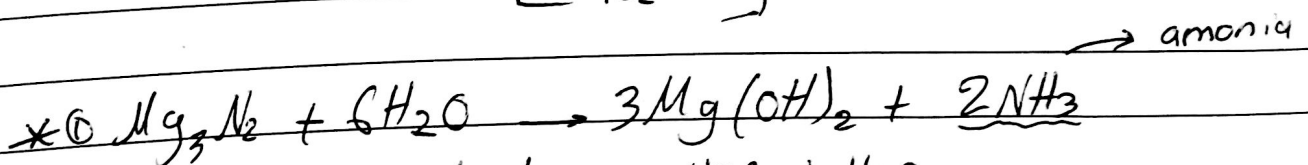
$$\rightarrow \text{mass percent of "X" in XO (oxide)} \\ = \frac{\text{mass X}}{\text{mass XO}} \times 100\% \Rightarrow \text{experimentally } \underline{\underline{X_1}}$$

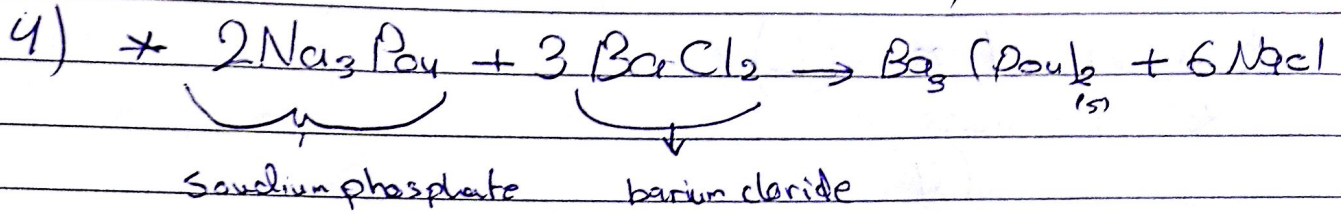
~~percent error~~

Mass percent of Mg in MgO (calculated)

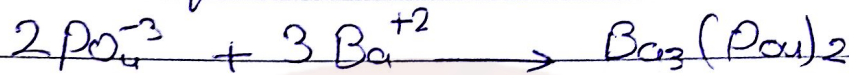
$$= \frac{\text{Molar Mass of Mg}}{\text{Molar Mass of MgO}} \times 100\% \quad \underline{\underline{X_2}}$$

$$\rightarrow \text{percent error} = \left[\frac{|X_2 - X_1|}{X_2} \right] \times 100\%$$





* net Ionic equation :-



* if we have masses $\xrightarrow{\text{moles}}$

"moles" limiting reactant $\xleftarrow{\text{المحدد}} \xleftarrow{\text{المحدد}} \text{limiting reactant} \xleftarrow{\text{المحدد}}$

$\rightarrow$ moles of product $\xrightarrow{\text{المحدد}} \xrightarrow{\text{المحدد}} \text{mass by} = n \times M_u$

* Mass of excess = $\text{Mass of salt mix} - (\text{Mass of limiting} + \text{Mass of Ba} \dots)$

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

* test for excess of PO_4^{3-}

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

* test for excess BaCl_2 $\xrightarrow{\text{المحدد}}$

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

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

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

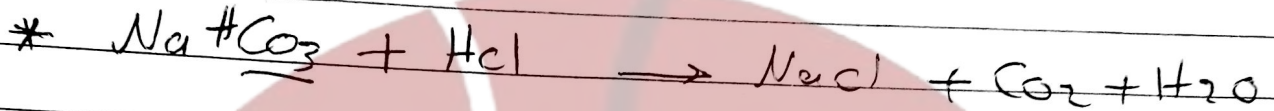
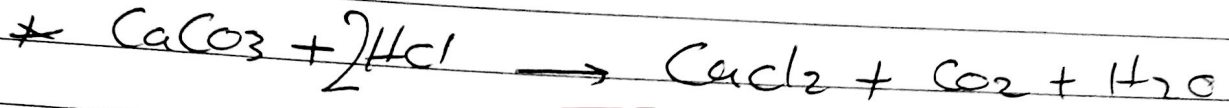
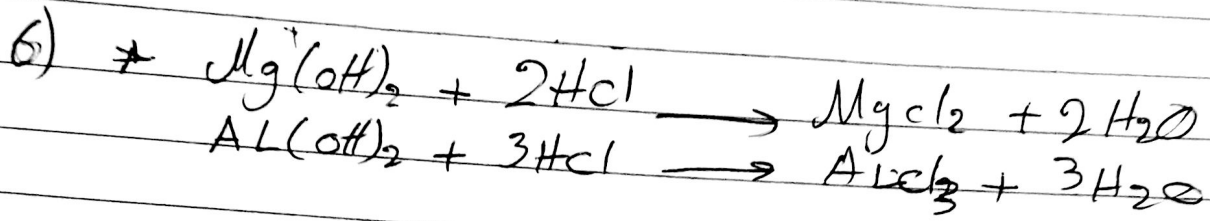
* the Indicator phenolphthalein, which is colorless in acid and pink in base

* we have volume and we have molarity → moles of base
 molarity ← moles of acid
 mass ← $\times MM$ 1:1

* Mass percent acetic acid in Vinger

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

ask ; believe & recieve



* Mass of antacid sample
 ~~~g

HCl

$$n_1 = V \times M$$

used to dissolve antacid.

NaOH

$$n_2 = V \times M$$

same HCl

buret reading

~~Excess HCl~~  ~~$n_1 - n_2$~~

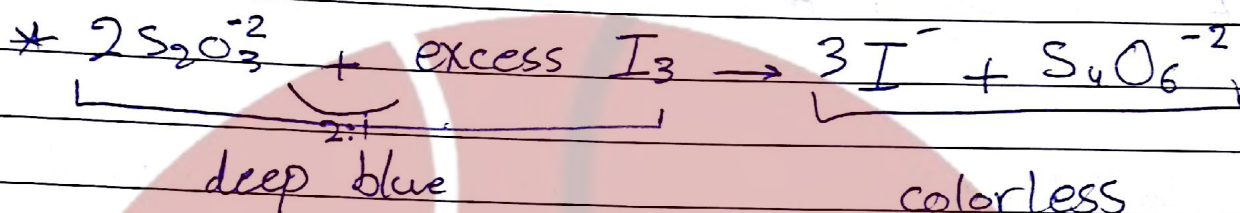
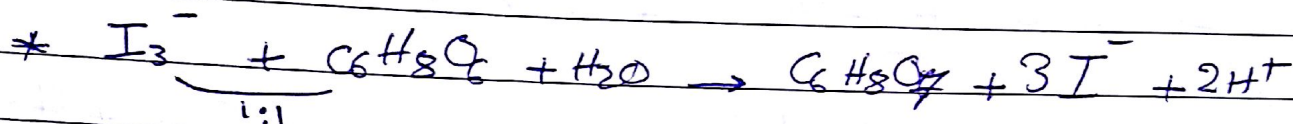
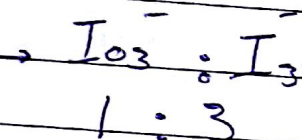
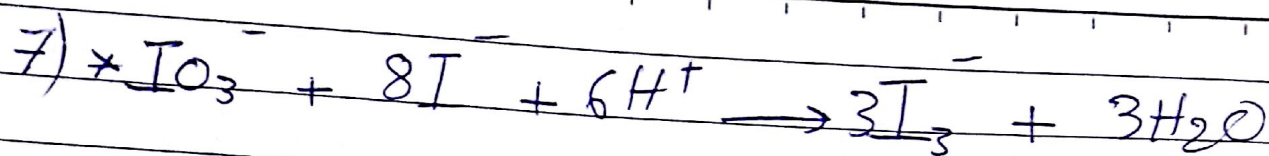
$$\left[ \begin{array}{l} n_{\text{excess of HCl}} \\ = n_2 \end{array} \right]$$

$$n_{\text{nut}} = n_1 - n_2$$

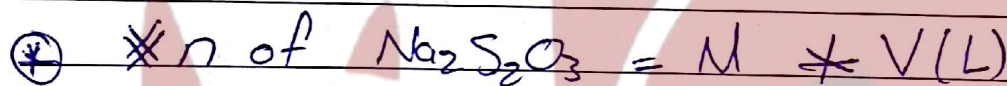
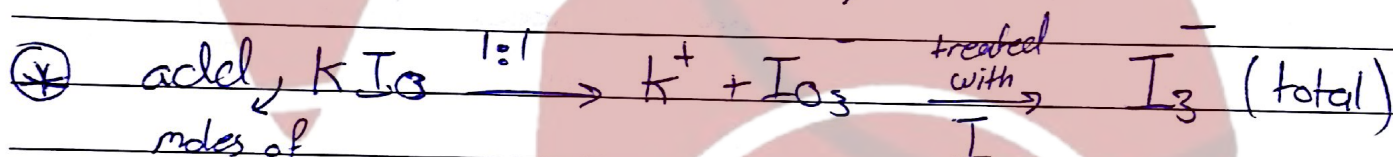
needed to neutralize antacid tablet

\* Neutralizing capacity of antacid

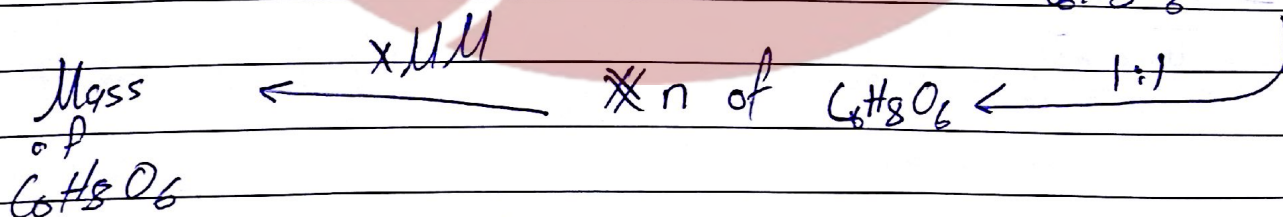
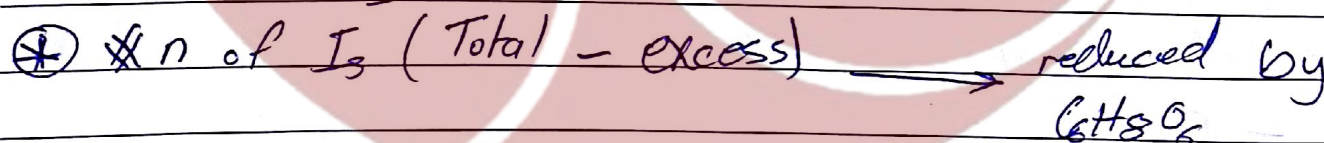
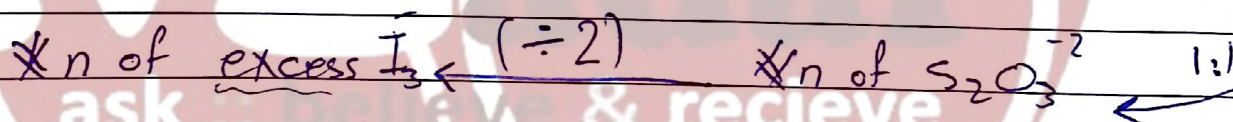
$$= \frac{n_{\text{nut}}}{\text{Mass of antacid}}$$



① mass for sample

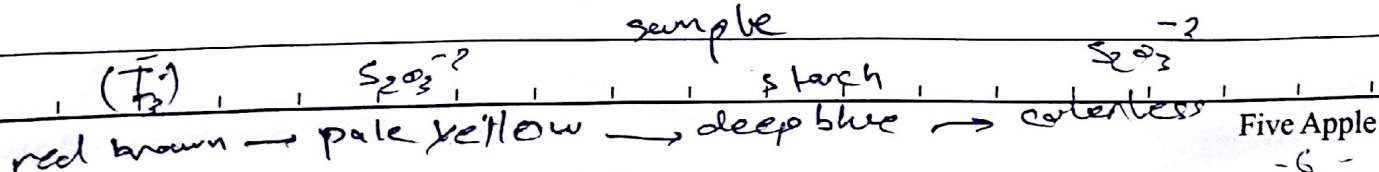


1 L                      buret (F-I)

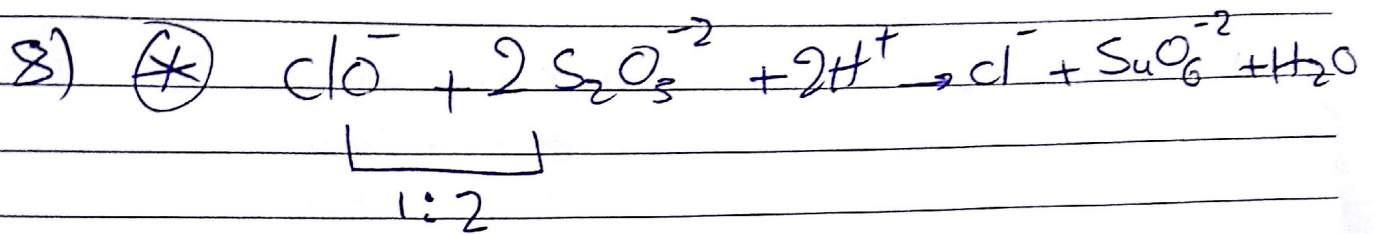


Mass percent

$$\frac{\text{mass}}{\text{sample}} \times 100\%$$







① Volume of bleach solution ~~Notes of bleach~~

② Volume of  $\text{Na}_2\text{S}_2\text{O}_3$  solution (buret reading (I - I))

\* n of  $\text{ClO}^-$  reduced  $\xleftarrow[\text{(1:2)}]{\div 2}$  \* n of  $\text{Na}_2\text{S}_2\text{O}_3$   $\xleftarrow{\times M}$

$\div$  volume of bleach

Molarity of diluted bleach

Molarity of original bleach

$\times$  diluted factor

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

$$* \text{diluted factor} = \frac{\text{original}}{\text{diluted}}$$

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

$$\rightarrow PV = nRT$$

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

P: atm

V: L

Mass: g

T: K°

MM: g/mole

for  $\equiv$  mmHg

( $\div 760$ )

atm

10)

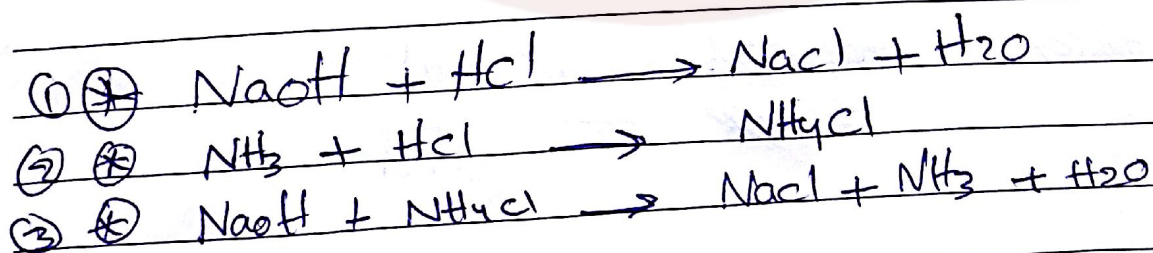
Heat lost = Heat gained

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

for cold water

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

↓  
cal constant





A)  $(q_{\text{hot}})$  Heat lost by hot water =  $m \times S \times \Delta t$   
 $(q_{\text{cold}}) = \text{gained} = \text{cold} = m \times S \times \Delta t$   
 $(q_{\text{hot}})$  Heat gained by cold water = (lost - cold)

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

B)  $(q_{\text{sol}})$  Heat gained by solution =  $m \times S \times \Delta t$   
 $(q_{\text{cal}}) = \text{cal} = C \times \Delta t$   
 Heat of the reaction =  $-(q_{\text{sol}} + q_{\text{cal}})$

$\Delta H = \frac{\text{Heat of the reaction (kJ)}}{\text{No of water} \approx \text{NaOH} \approx \text{HCl}}$

\*  $V + V = 2V$

\*  $m + m = 2m$

c) same part (13)

\* to determined the third equation enthalpy  
 $(\Delta H) \rightarrow \text{NaOH} + \text{NH}_4\text{Cl} \rightarrow \text{NaCl} + \text{NH}_3 + \text{H}_2\text{O}$

$\Delta H_{\text{Third}} = \Delta H_{\text{(First)}} + (-\Delta H_{\text{(Second)}})$  "Hess's law"