Unknown Salt No. (   )

Radical name:...……………

Chemical symbol of radical: ………………………

Physical properties:

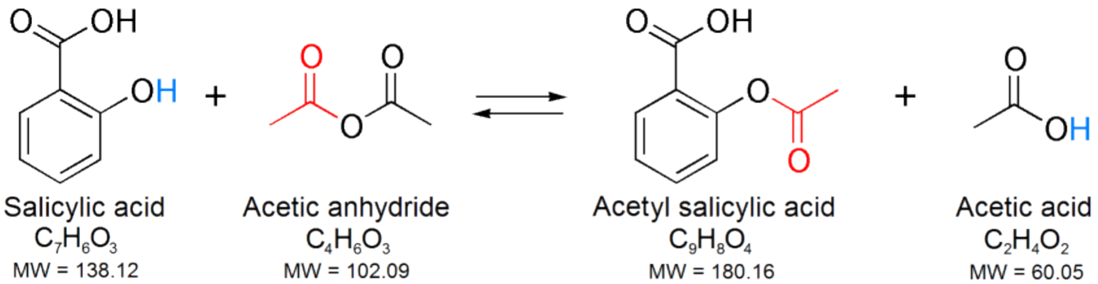
Colour: …………………… Shape: …………………

Solubility: ……………… pH: ……………………

Experiment	Observation	Result

Experiment 1

Synthesis of Aspirin



1. Weigh out 2g Salicylic acid directly into a 125 ml conical flask.
2. Add 5 ml of acetic anhydride using a graduated cylinder. Swirl the flask gently.
3. Add 10 drops of con. H_2SO_4. Swirl the mixture gently.
4. Place the flask in hot water bath for 15 min.
5. Add 5 ml water while the mix is hot.
6. Then add additional 25 ml of cold water and then swirl the flask.
7. Allow the flask to stand in an ice water bath for 15 min.
8. Filter the crude product using suction and wash 3 times with 15 ml portions of cold water.
9. Calculate the theoretical yield of your product, compare between the practical and theoretical yield and then calculate % yield.

Salicylic acid (A) ≈ 2 gm	gm
Filter paper (B)	gm
Dry filter paper with aspirin (C)	gm
Actual aspirin mass obtained (C-B)	gm

The calculated mass (theoretical) of Aspirin = (A * 180 gm) / 138.12 gm

$$\text{Percent yield} = \frac{\text{actual mass obtained}}{\text{calculated mass}} \times 100$$

Experiment 2

Quantitative Determination of a Chemical Formula

$Mg (s) + 2HCl (aq) \dashrightarrow MgCl_2 (aq) + H_2(g)$

Mass of empty beaker (**A)**	
Mass of empty beaker + magnesium (**B)**	
Mass of empty beaker + magnesium chloride (**C)**	
Mass of magnesium **(B-A)**	
Mass of magnesium chloride **(C-A)**	
Mass of chlorine in compound **(C-B)**	

Atomic mass of (**Mg** = 24.3 and **Cl** = 35.5), Molar mass of $\mathbf{MgCl_2}$ is 95.2115 g/mol

1- Calculate the percent composition of magnesium chloride

a. Experimentally

$$\frac{\text{mass of element}}{\text{mass of compound}} \times 100\%$$

b. Theoretically

$$\frac{\boldsymbol{n} \text{ x atomic mass of element}}{\text{molar mass of compound}} \times 100\%$$

2- Find out the empirical formula of Mg_nCl_m (experimentally).

Experiment 3

Titration Curve of a Strong Acid & Strong Base Using a pH meter

V_{NaOH} added (mL)	pH
0.00	1.4
2.40	1.44
4.80	1.53
7.20	1.72
8.80	2.05
9.88	2.91
9.96	3.11
10.04	3.44
10.12	6.92
10.20	10.3
10.28	10.77
10.36	10.95
10.44	11.09
11.24	11.63
12.04	11.82
12.84	11.93
13.64	12.01
14.44	12.05

1. Plot the reaction between volume of NaOH added (x-axis) and pH values (y-axis) using excel.

2. Determination the equivalence point e.p. (at pH=7) from the graph.

3. Calculate the concentration (molarity) of HCl (M_{HCl}) = (M_{NaOH} * V_{NaOH}) / V_{HCl}
where M_{NaOH} = 0.1 M, V_{NaOH} = e.p. (at pH=7) from the gra, V_{HCl} = 10 mL.

Experiment 4

Titration of Na_2CO_3 with HCl using an indicator

indicator	Acidic medium	Neutral	Basic medium	pH range
Ph.ph	colorless	faint pink	pink	8.3-10
M.O	red	orange	yellow	3.1-4.4

Indicator	V Na_2CO_3	V_1 HCl	V_2 HCl	V_3 HCl	$V_{Average}$ of HCl
ph.ph.	10 ml				
M.O.	10 ml				

Calculate the Molarity of HCl in both cases where V Na_2CO_3 = 10 ml, M Na_2CO_3 = 0.1 M ?

ph.ph	M.O.
$HCl + Na_2CO_3 = NaCl + NaHCO_3$	$HCl + NaHCO_3 = NaCl + CO_2 + H_2O$
Stage 1 (half of reaction)	Stage 2 (all of reaction)
	Overall reaction is
	$2\ HCl + Na_2CO_3 = 2\ NaCl + CO_2 + H_2O$
V1 HCl = ½ carbonate	$V_{2\ HCl}$ = all carbonate
V HCl = all carbonate = 2 V1 HCl	
$(M \times \mathbf{2\ V}_{\mathbf{Average}})_{HCl} = (M \times V)_{Na2CO3}$	$(M \times \mathbf{V}_{\mathbf{Average}})_{HCl} = (M \times V)_{Na2CO3}$