MARKING SCHEME

CHEMISTRY PRACTICAL

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution T used (cm^3)			

a) Complete table …….(1mk)
Complete table with 3 titrations done – 1mk
In Complete table with 2 titrations done - 1mk
incomplete table with 1 titration done – 0mks

Penalize ½ mk once for
- Inverted table
- Wrong anthmetic
- Unrealistic titre values (below 1 or above 50 unless explained)

b) Use of decimals……..1mk
- Accept 1 or 2 d.p uses consistently otherwise penalize fully
- If 2 d.p used the 2nd d.p should be either 0 or 5 otherwise penalize fully
-

c) Accuracy …….1mk
Compare the candidates titre values with the S.V
- If any value is within +- 0.1 award 1mk
- If within + -0.2 award ½ mk
- If beyond +- 0.2 award zero mark

d) Principles of averaging …….1mk
1f 3 consistent titrations done and averaged 1mk
If 3 titrations done but only 2 are consistent and averaged (1mk)

If only two titrations done, are consistent and averaged (1mk)
If 3 titrations done and are consistent but only 2 are averaged (0mk)
If 3 inconsistent titres averaged (0mk)
1f 2 inconsistent titres averaged (0mk)

e) Final answer accuracy……..1mk
Compare the candidates correct average titre with S.V
- If within +- 0.1 of S.V (1mk)
- If within +- 0.2 of S.V (½ mk)
- If beyond +- 0.2 of S.V (0mk)

a) Calculate the:

i. Average volume of solution T used (1 mark)

Captured in principal of averaging

ii. The number of moles of solution Z used in titration (1 mark)

$$\frac{25.0\ x\ 0.4}{1000} = 0.01\ moles$$

iii. Concentration of solution T in moles per liter. (2 marks)

$NaOH_{(aq)} + HCl_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(l)}$

0.01moles ⟶ Average titre volume

⟵ $1000cm^3$

$$\frac{1000 \times 0.01}{\text{Average titre volume}}$$

iv. Calculate the mass of sodium carbonate that reacted with solution Y. (Na= 23, C= 12, O= 16) (3marks)

Calculate the mass of sodium carbonate that reacted with solution Y. (Na= 23, C= 12, O= 16) (3marks)

$Na_2CO_{3(s)} + 2HCl_{(aq)} \longrightarrow NaCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$

Number of moles of HCl in average titre ⟶ 0.01moles

$250cm^3$ ⟶ ?

$$\frac{250 \times 0.01}{\text{Average titre volume}}$$

Original number of moles of HCl = $\frac{2 \times 80}{1000}$ = 0.16moles

Moles of HCl that reacted with Carbonate = 0.16 − number of mol in $250cm^3$

Moles of Sodium Carbonate = $\frac{1}{2}$ x the difference in moles abo

RFM of Na_2CO_3 = (23x2) + 12 + (16x3) = 106

106g ⟶ 1mole

? ⟵ No. of moles of sodium Carbonate

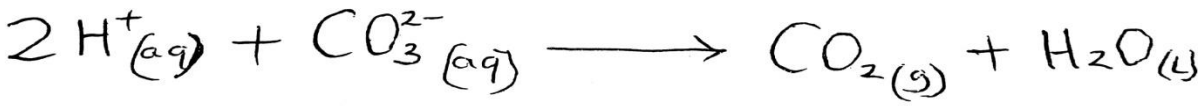
Mass of Sodium Carbonate = Number of moles of Na_2CO_3 x 106

(1 mark)

v. Work out the percentage purity of solid X. (1 mark)

$$\frac{mass\ of\ sodium\ carbonate\ that\ reacted\ with\ solution\ Y}{5} \times 100$$

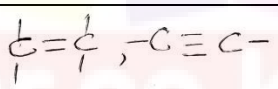
b) Write the ionic equation between solid X and solution Y. (1 mark



3. **You are provided with solid L. Carry out the test below and record your observations and inferences in the spaces provided.**

a) Describe solid. (2 marks)

b) Place half spatula of L in a non-luminous flame of a Bunsen burner.

Observations	Inference
Solid melts and burns with a yellow sooty flame ($^1/_2$ mark)	 ($^1/_2$ mark)

c) Dissolve the remaining solid L in the distilled water and divide the solution into four portions.

i. To the fourth portion, add few drops of acidified potassium chromate (vi) and warm.

Observations	Inference
Orange acidified potassium chromate VI does not change to green *Reject persist or remains or no color change, no observable change* ($^1/_2$ mark)	R-OH absent ($^1/_2$ mark)

ii. To the second portion, add few drops of bromine water and warm.

Observations	Inference
Yellow bromine water changes to colorless / decolorized **(1/2 mark)**	$-C=C-$, $-C\equiv C-$ (1/2 mark)

iii. To the third portion add few drops of acidified potassium manganite (vii) and warm.

Observations	Inference
Purple acidified potassium manganate VII changes to colourless (1/2 mark)	$-C=C-$, $-C\equiv C-$ (1/2 mark)

iv. To the fourth portion add a quarter spatula end-full of sodium hydrogen carbonate.

Observations	Inference
Effervescence / bubbles produced (1/2 mark)	R-COOH (1/2 mark)