SERIES 49 EXAMS

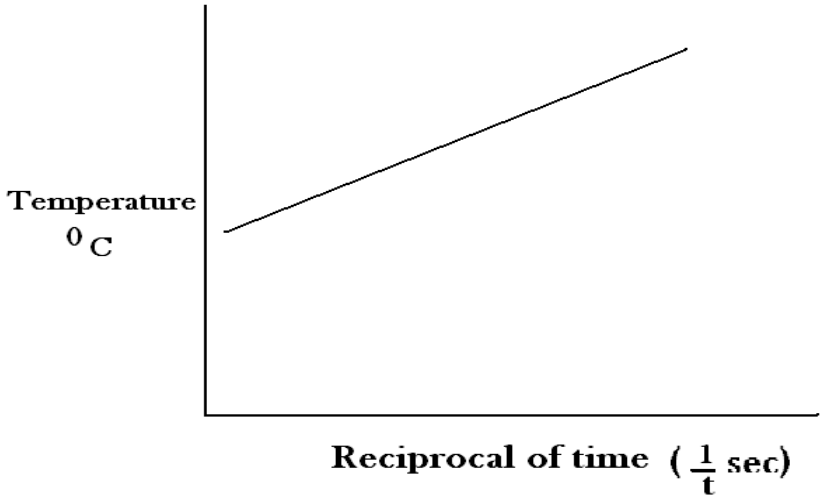
233/3
CHEMISTRY
PAPER 3
MARKING SCHEME

1. Table 1.

Temperature(^{0}C)	Time(Sec)	Reciprocal
Room	30	0.0333
30	23	0.0435
35	18	0.0556
40	14	0.0714
45	11	0.0909
50	9	0.1111
55	8	0.125
60	5	0.1613

Time in sec. complete table (1 mark)
$\frac{1}{t}$ (according to the candiatation 5-8 correct (1 mark)
2-4 correct (½ mark)
Decimal consistency (1 mark)
Accuracy against school value(room temperature) (1 mark)
Trend (showing in time) (1 mark)

a) Graph ½ mark(Note: Graph should cover 75% of the grid)
Scale ½ mark
Labelling ½ mark
Plots ½ mark
Line 5-8 plots correct (1 mark)
2-4plots correct (½ mark)



b) As the temperature increases, the rate of reaction between sodium thiosulphate and dilute hydrochloric acid increases✓ (1 mark)

c) i) $Time = \frac{1}{0.17}$ ✓ ½ =5.882 ≈ 6 sec ✓ ½
ii) Temperature=34.5^{0}C (1 mark)

Table II

I		II	III
Final Burette Reading	24.0	48.0	34.0
Initial Burette Reading	0.0	24.0	10.0
Volume of Solution	24.0	24.0	24.0

Complete table (1 mark)
Decimal consistency (1 mark)
Accuracy against school value (1 mark)

d) i) principle average

$\frac{24.0 + 24.0 + 24.0}{3}$ ✓ ½ =24.0 ✓ ½

ii) 2 moles=1000 cm^3

$\frac{12.5}{1000} \times 2$ ✓ ½ =0.025 moles ✓ ½

0.025 moles in 250 cm^3

In 24.0 cm^3 we have

$\frac{24}{250} \times 0.025$ ✓ ½ =0.0024 moles of HCL ✓ ½

iii) Moles of C

$\frac{25}{1000} \times 0.1$ ✓ ½ =0.0025 ✓ ½ moles of alkali used

iv) Reaction mole ratio of

Acid	Alkali
0.0024=1	0.0025 =1✓ ½
0.0024	0.0024

1:1 ✓ ½

v) Ionic equation

$H^+_{(aq)} + OH^-_{(aq)} \quad H_2l_{(l)}$ (1 mark)

2. a)

Observation	Inferences
- Colourless liquid forms✓ ½ - Vapour condenses on cooler part of test tube✓ ½ - Red litmus remains red - Blue litmus turns red ✓ ½ - Yellow solid when hot white when cold✓ ½ Reject water forms	- Contains water of crystallization - Hydrated salt ✓ ½ - Acidic gas ✓ ½ - ZnO

b)

Observation	Inferences
- White precipitate ✓ ½ - Dissolves in excess✓ ½	Pb^{2+} , Zn^{2+} , Al^{3+} present

3 ions	1 mark
2 ions	½ mark
1 ion	0 mark

c)

Observation	Inferences
- White precipitate ✓ ½ - Dissolves in excess✓ ½	Zn^{2+} present

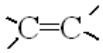
Award zero for any contradictory ion

d)

Observation	Inferences
- White precipitate ✓ ½ - Dissolves on warming✓ ½	Cl^- present ✓1

Any contradictory ion award zero

3. a)

Observation	Inferences
- Burns with smoky✓ ½ yellow flame/smoky/sooty falme✓	- Long chain carbon compound✓ ½ - Unsaturated / -C≡C- or  ✓ ½

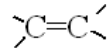
b)

Observation	Inferences
- Dissolves in water to form colourless solutio✓1	Polar substance /compound✓1

c)

Observation	Inferences
- PH3 or 4✓1	Weak acid✓1

d)

Observation	Inferences
- Acidified potassium manganate(VII) decolourised/Turns colourless/Pink to colourless✓1	 ✓ ½ or -C≡C- or R-OH present

Enalize for C=C or C≡C

e)

Observation	Inferences
- Effervescence/bubbling fizzling✓ 1	H^+ or RCOOH present ✓ 1