233/3
CHEMISTRY
Paper 3
(PRACTICAL)
Time: 2 Hours

1.

Table II	1	2	3
Final burette readings(cm^3)	11.4	22.8	34.2
Initial burette readings(cm^3)	0.0	11.4	2.8
Volume of HCl used cm^3(solution N)	11.4	11.4	11.4

(3 mks)

CT - 1 mk

Penalize ½ mk for wrong arithmetic, unrealistic figures, incomplete table to a maximum of ½ mk

- If only one experiment done = 0
- If 2 experiment done = ½ mk
- If all experiments done = 1 mk

DP – ½

1 or 2 dp used consistently

Penalize fully if mixed or missing

ACC. = ½ mk

± 0.1 deviation from S.V ½ mk

Otherwise penalise fully.

P.A = 1 mk

Values average within ± 0.2 and correct working shown and correct answer given. 1 mk

If no working shown but correct answer ½ mk

If wrong units penalize ½ mk

If no units ignore.

F.A = 1 mk

± 0.1 deviation from school average titre 1 mk

± 0.2 deviation from school average titre ½ mk

If wrong units penalize fully if no units ignore.

a) (i) $\frac{11.4+11.4+11.4}{3} = 11.4$

ii) $\frac{0.2x25}{1000} = 0.005$ moles

iii) Mole ratio of HCl : NaOH is 1:1

$\frac{0.005 moles x 1000}{11.4} = 0.4386$ mol/ line or mol/dm^3 or 0.4386M

TABLE II

Marked as table I

	1	2	3
Final burette readings(cm^3)	40.0	40.0	40.0
Initial burette readings(cm^3)	0.0	0.0	0.0
Volume of solution L used cm^3	40.0	40.0	40.0

(4mks)

CT – 1

DP – ½

AC – ½

PA – 1

FA – 1

b. (i) $= \frac{40.0+40.0+40.0}{3} = 40.0\ cm^3$

(ii) Mole ratio 1:1

Moles in 25 cm^3 of NaOH = moles in 40 cm of HCL

= 0.005 moles as in a (ii) above

(iii) Moles of H1 100cm^3 of solution L.

$= \frac{100x0.005}{40} = 0.0125$ moles.

(iv) 1000 cm^3 of solution N = 0.4386 moles

100 cm3 of solution N:

$= \frac{0.4386x100}{1000}$

= 0.04386 moles

(v) Moles of HCl reacted with solid +

Answer in (iv) – answer in (iii)

= 0.04386 – 0.0125

= 0.03136 moles

(vi) Moles of F_2CO_3 reacted

= Mole ratio 1:2

= F_2CO_2 : HCl

$= \frac{0.03136}{2}$

= 0.01568 moles

(vii) RMM = 1g contain 0.03136 moles

1 mole will contain

$= \frac{1x1}{0.03136}$

= 63.7755 ≅ 64

RFM of F2CO3 = (64 x 2 + 12 +48) = 128

$F = \frac{128 - 60}{2}$

F = 38

2. **C-T – 2 mks** as follows

8 readings – 2mk

6 – 7 readings – 1 mk

4 -5 readings – ½ mk

0-4 readings – 0 mk

Readings between (40 and 90s)

NB: Correct working on 1/t

DP – 2 mks

Time 1 or whole numbers

1/t minimum of 4 dp unless it divides fully.

AC – 1 mk

Tied to 1st reading ± 0.5 deriation from school value.

Trend 1 mk

Time increasing with increase in temperature otherwise penalize fully.

Graphs

a) i) Time(s) x axis labelled correctly with units

L = ½ mk

S = ½ mk

Plot = 1 mk

Curve = 1 mk

NB: Label axis labelled correctly with units or penalize fully

If interchange penalize fully

Scale

Atleast ½ of the grid provided should be occupied.

Plot

8 plots – 1 mk

5 – 7 plots – ½ mk

0 – 4 plots – 0 mk

Curve

A curve descending from left to right. Otherwise penalize fully.

2. a) ii) Plot a graph of 1/t against temperature change

L - ½ mk

S - ½ mk

P - 1 mk

C - 1 mk

NB: Mark as a (i) above

b) As temperature increases rate of reaction also increases

c) Read 1/t at 58℃ from candidates graph

e.g. 0.17

1/t = 0.17, t 1/0.17 = 5.8823 ≅ 6 sec

½ mk showing , ½ mk correct as

d) Student should draw a tangent at 4.3℃ and work out as shown

$$\frac{\Delta \text{Temp}}{\Delta \text{Time}} \quad Or \quad \frac{\Delta y\ axis}{\Delta\ in\ x\ axis}$$

$$= \frac{56-22}{21-7} = 2.4286$$

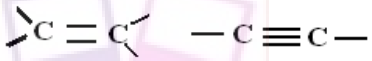
Showing ½ mk

Correct answer ½ mk

3. (a)

Observations	Inference
Efferescence / bubbles / fizzles / colourless gas produced White ppt or glass rod	CO_3^{2-} or HCO_3^- present
White ppt solution \warming but reappears on cooling	Cl- Present
No white ppt formed	Zn^{2+}, Al^{3+} Pb^{2+} Absent

(b)

Observations	Inference
PH – 4 – 6 (i) Indicator paper turns Yellow orange	-Weekly acidic substance -R – COOH / H^+ /H^3O^+
(ii) Effervescence / bubbles / fizzing / colourless gas produced or evolved	$H+_{(aq)}$ ions / H_2O^+ / R-COO
Purple colour persists	R-OH,  Absent
Sweet smell	R-COOH confirmed present

Conditions for Q3

Reject words instead of chemical symbol