SERIES 24 EXAMS

CHEMISTRY 233/3 marking scheme

1.

Final temperature (^oC)	29.0
Initial temperature (^oC)	26.0

CT √ ½
DP √ ½ (Accept whole numbers)
A√ ½ (Teachers initial temperature)±2
a) ΔT = Final Temperature – initial Temperature
= 29.0 – 26.0 = 3.0 √ ½
b) 0.04 = 0.001667 moles
24 computation √ ½
Answer √ ½
c) m= $100cm^3$ x $1g/cm^3$ = 100g √ ½
Q = 100 x 4.2 x Ans(a) √ ½
1000
= Ans $KJmol^{-1}$ √ 1
NB: Penalise 1mk for wrong units.
TABLE II

	I	II	III
Final burette reading (cm^3)	22.0	22.0	22.0
Initial burette reading (cm^3)	0.0	0.0	0.0
Volume of solution F (cm^3)	22.0	22.0	22.0

Complete table - 1mk

Conditions

3 readings (consistent) – 1
1 or 2 consistent readings – 0
2 in consistent readings – 0

Penalties

- Wrong Anthrmetic
- Inverted table.
- Un realistic readings.

NB: For each penalize ½ mk up to a maximum of ½ mk

Decimal point – 1 mk

- Accept either 1 or 2 d.p used consistently otherwise penalize fully.
- If two d.p used the 2nd d.p must be either be 'o' or '5'
- Accept inconsistency of 0 i.e 0.0 or 0.00 or 0.000

Accuracy 1mk

- Compare any one of students readings with the school titre value
- If at least 1 reading with ± 0.1 √ 1
- If within ± 0.2 √ ½
- If not within ± 0.2 √ 0

Principles of averaging

a) 22.0 + 22.0 + 22.00 = √ 22.0 cm^3 √
3

Conditions

If within 1mk
If none within 0 mk
If inconsistent values overage - 0mk
Correct working, wrong answer – ½ mk
No working, correct answer – ½ mk
If wrong arithmetic, penalize ½ mk
Final Answer 1mk
Compare the average value with the teachers average value.

- If within ± 0.1 – 1mk
- If not within ± 0.1 – 0mk

Total marks 5 mks

b) i) the no. of moles of B

$\frac{25 \times 0.5}{1000}$ = 0.0125 moles √ computation ½ mk

√ Ans ½

ii) the no. of moles of acid in F

mole ratio = 1:1 √ mole ration ½ mk

= 0.0125 moles √ ½ mk

iii) moles of acid in 100 cm^3 of F

$\frac{100 \times 0.0125}{22}$ = 0.05682 moles √ computation ½ mk

√ Ans ½

iv) Initial no. of moles = moles reacted with solid C+ moles reacted with NaOH

= (0.00167 x 2) √ + 0.05682 √ computation ½ mk

= (0.00333 + 0.05682) moles per 1000 cm3 √ Ans ½

= 0.06015 moles √ Ans ½ mk

v) Morality of A.

$\frac{1000 \times 0.06015}{100}$ = 0.6015 √ computation ½ mk

= 0.602 M √ Ans ½

2. TABLE III

	1	2	3	4	5
Volume of D (cm^3)	40	20	20	20	20
Volume of E(cm^3)	20	17.5	15.0	12.5	10
Volume of water (cm^3)	0	2.5	5	7.5	10
Time taken for x to disappear (sec)	17	25	32	39	46
$\frac{1}{t}$ (sec -1)	0.0588	0.040	0.0312	0.0256	0.0217

√ **compete table 1mk**

- Reject readings in mins.
- Filled table and correct computation – 1

√ **Decimal points 1mk**

- Accept $\frac{1}{t}$ to 4th d.p moles divided fully
- Reject $\frac{1}{t}$ in fraction.

√ **Accuracy 1mk**

- Tied to school values 1st reading at 0 cm^3 of water ± 2 sec.

√ **Trend 1mk**

- Increase in time continuously.

a) GRAPH (See the graph paper)

√ Plotting 1mk

- 5 correct plots 1mks

5 plotted, 4 correct plots – ½ mk.

5 plotted, 1-3 wrong plots – 0mk

√ Scale ½ mk

√ Labelling ½

√ Straight line (Line of best fit) 1mk

b) i) $^1/_T$ = 3.75 x 10-2 sec

= t = 26.67secs Accept ± -2

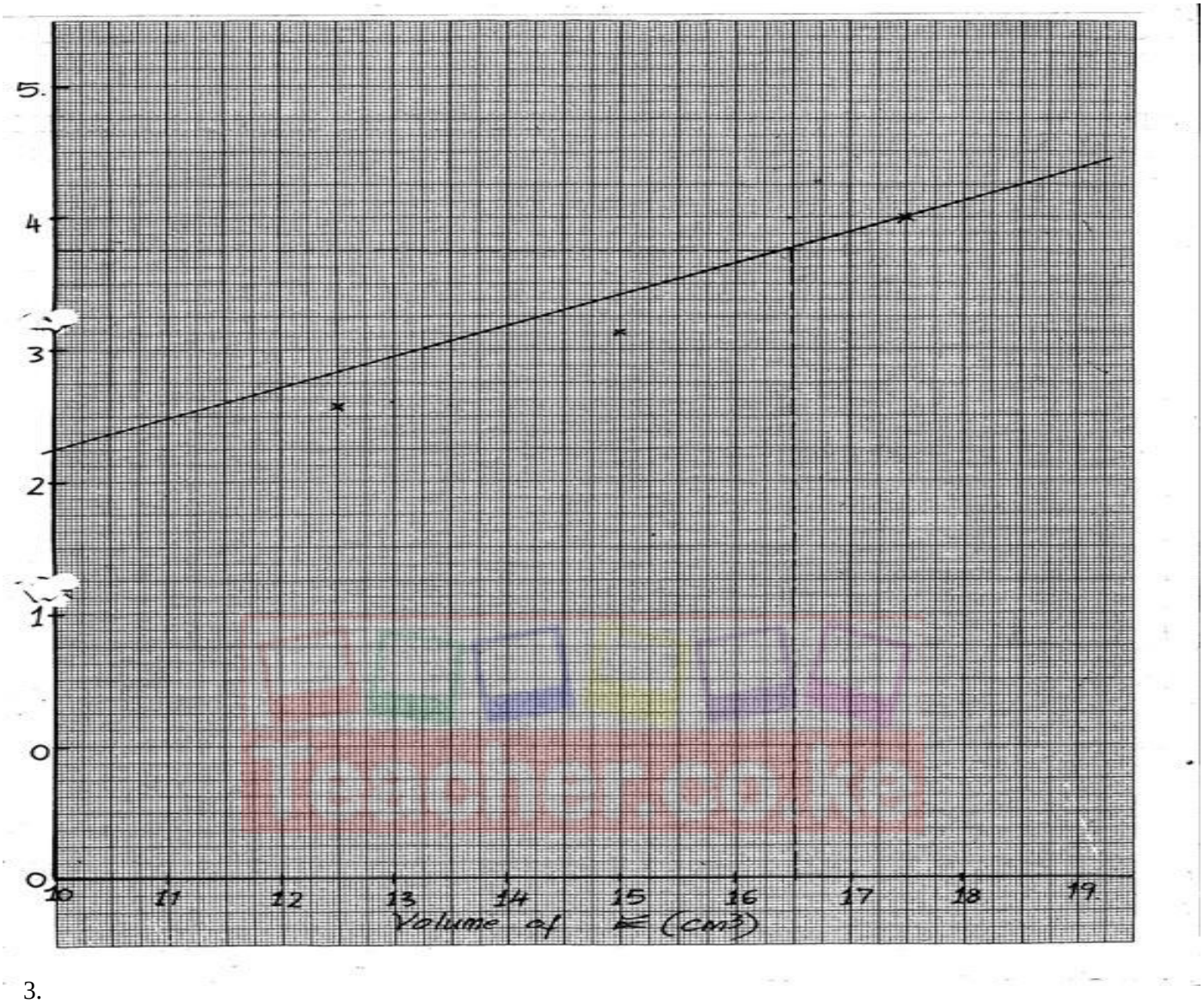
ii) $C_1 V_1 = C_2 V_2$

2x 16.5 = C_2 x 20

$C_2 = \frac{2x16.5}{20}$√ = 1.65 M√ computation √ ½

Ans √ ½

c) The graph is a straight line. This indicates that the rate of reaction is directly proportional to the concentration of the acid solution E √ (1mk)
OR (words to the relationship of diluting, decrease in the time, increase in reciprocal)



3.

Observation	Inference.
a) Solid dissolves to form a colourless√ 1 solution. i) White precipitate √ ½ soluble in excess √ ½	Soluble salt √ 1mk Al^{3+}, Pb^{2+} , Zn^{2+} √ (*3 ions – 1mk, 2 ions - ½ mk, 1 ion – Omk* *Penalize full for contradictory ion)* Al^{3+}, Pb^{2+} √ (*2 ions - 1mk, 1 ion - ½ mk*)
ii) White precipitate √ ½ insoluble in excess √ ½	Al^{3+} confirmed √ Or Pb^{2+} absent. *Reject if not mentioned in a(i) and (ii) above.*
iii) No white precipitate √ ½	SO_4^{2-} , Cl- √ *Two mentioned – 1mk* One mentioned – ½ mk
iv) White precipitate, √ ½ insoluble in dilute nitric acid.	C = C , C≡C- 2 group – 1 √ 1 group – ½
b)i) solid melts. ½ √ burns with yellow smoky/sooty/luminous flame √ ½	$R - COOH/H^+$ √ ½ C = C , C ≡ C √ 2 group – 1

II i) PH = 4-6 √ ½ ii) Purple KMnO4 decolourises √ iii) Effervescence /hissing sound. √ ½	1 group – ½ Acidic substance/R- COOH/H^+ √ ½