SERIES 37 EXAMS

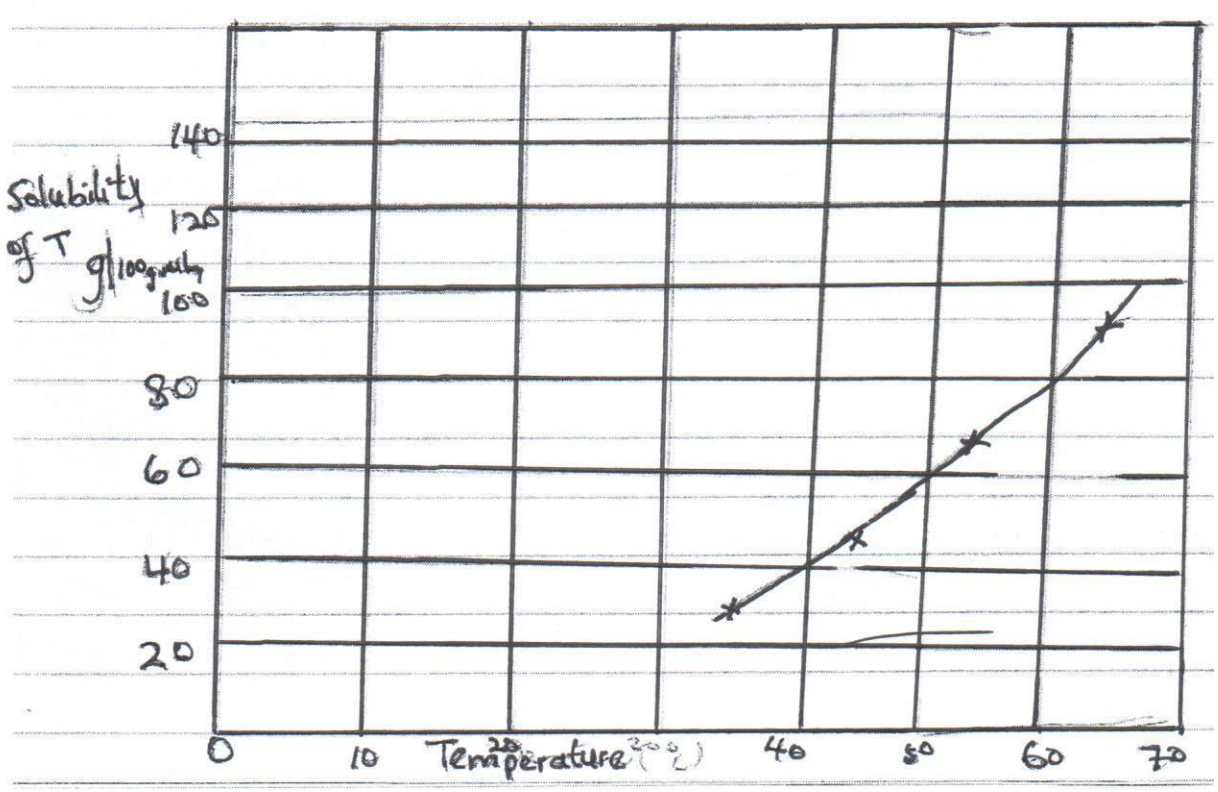
233/3 – CHEMISTRY PAPER 3
MARKING SCHEME

1. TABLE I

Volume of distilled water in boiling tube	Crystallization temperature	Stability of solid T in 100g / water
4	70.0	100
6	56.0	66.67
8	49.0	50.00
12	35.0	33.33

Complete table (4mks)
Decimal place (½ mk)
Accuracy (½ mk)
Trend (1mk)
Total 6mks

GRAPH



(i) Solubility at 55^0
Showing √½
Correct value √½

(ii) Temperature – 80g / 100g of water
Showing √½
Correct value √½

Procedure II

	I	II	III
Final burette reading cm^3	19.8	37.5	19.6
Initial burette reading cm^3	0.0	19.8	0.0
Volume of T used cm^3	19.8	19.7	19.6

Average volume = $19.70cm^2$ √1

TABLE II
Complete table (1mk)
Decimal place (1mk)
Accuracy (1mk)
Principles of averaging (1mk)
Final answer (1mk)

Calculations

(b) (i) Moles of Q

$$n = \frac{cxv}{1000} = \frac{(0.2 \times 25)}{1000}$$ √½

$$= 0.005 moles$$ √½

(ii) $H_2C_2O_{4(aq)} + 2NaOH_{(aq)} \rightarrow Na_2C_2O_{4(aq)} + 2H_2O_{(l)}$
1:2√½

Moles of T = (½ X 0.005) √1
= 0.0025mols. √1

(iii) Molarity of T

$$M = \frac{16}{1}$$

(iv) $C = \frac{n \times 1000}{V}$

$$= \frac{(0.0025 \times 1000)}{19.7}$$ √½

$$= 0.1269M$$ √½

(c) RFM = $\frac{\text{Mass per litre}}{\text{Molanli}}$

$$= \frac{16}{0.1267} = 126.08$$ √½

$H_2C_2O_4.nH_2$ = 126.08
90 + 18n = 126√½
18n = 36√½
n = 2√½

2. (a)
(i)

Observation	Inference
Yellow ppt√½ Soluble on warming √½	Pb^{2+}√½

(ii)

Observation	Inference
Yellow ppt / residue / solid Blue Green filtrate	Pb^{2+}√½ Cu2+ / Fe2+ present√½

Observation	Inference
Blue ppt. √½ Insoluble in excess√½	Cu^{2+} √½

Observation	Inference
Blue ppt. √½ Deep blue solution in excess√½	Cu^{2+} √½

Observation	Inference
Brown deposit√½ Green colour fades√½	Cu^{2+} displaced from solution √1

3. (i)

Observation	Inference
Burns with a yellow sooty / smoky flame.	Long chain hydrocarbon - unsaturated organic cpd - = c = c = or – c = c -

(ii)

Observation	Inference
- Dissolve to form colourless solution or - Forms colourless solution	Polar organic compound / polar cpd Accept Soluble salt / cpd

Observation	Inference
Effervescence / bubble / fizzling Reject; Hissing	COOH / H^- / H_3O^+√1 Acidic cpd; organic acid; carbonic acid; acidic solution

Observation	Inference
Orange colour persists / remains the same OR√1 Orange colour does not turn green Reject: yellow colour persists.	Absence of R-OH√1

Observation	Inference
$KMnO_4$ decolourized or $KMnO_4$ changes√1 from purple to colourless. Reject: solution remains colourless.	= c = c = / - c = c – Present Accept: Unsaturated organic cpd √½