

CHEMISTRY PAPER 3

MAKING SCHEME

Q1 TABLE 1

- a)
- Complete Table(1mark)
 - Conditions-3 titrations done and consistent (1mark)
 - 2titrations done and consistent (½ mark)
 - 2titrations done and inconsistent (0mark)
 - 1 titration done (0mark)
 - Penalties (i) Wrong arithmetic
 - (ii)Inverted table
 - (iii)Un realistic readings below 0.0 cm³ or beyond 50.0cm
 - Total penalty for all or one of the above ½ mark
 - Decimal (D)1mark
 - Conditions (tied to 1st and 2nd rows only)
 - One decimal place or two decimal places throughout
 - If 2 decimal places used.2nd place must be 0 or 5 eg .14.00 14.05
 - Allow inconsistency of zero e.g.0, 00.00
 - Accuracy (A).....1mark
 - Compare with school value (s.v)
 - If beyond ± 0.2 0mk
 - Principle of Averaging (PA).....1mark
 - (Value averaged must be within ± 0.2 of each other)
 - 3 consistent titration value averaged 1mark
 - 3titration done but 2 are consistent and averaged 1mark
 - 3 consistent titrations and only 2 averaged 0mark
 - 3 consistent titrations done and average volume used is
 - Final Answer (FA).....
 - Conditions –if final answer ie.The average volume used is
 - Within ± 0.1 of s.v 1mark
 - Within ± 0.2 of s.v ½ mark
 - Beyond ± 0.2 of s.v 0mark
 - Show distribution of marks along the table with the labels
 - T= 1
 - D=1
 - A=1
 - PA=1
 - FA=1
 - Expected titre value Table 1 is 23.5cm³

Calculations

Conditions

- i) Penalise fully where a strange figure is used in the working
 - ii) Penalise the working if previous answer is transferred incorrectly i.e rounding off
 - iii) All answers must be at least 3d-p otherwise penalize the answer fully.
 - iv) Units may not be shown but if shown and are incorrect, penalize the answer fully.
- ii) Molar Mass of Na₂CO₃
- $$(23 \times 2 + 12 + 16 \times 3) 106$$
- $$\text{Concentration} = \frac{8}{106} = \checkmark \frac{1}{2}$$
- $$0.07547 \checkmark \frac{1}{2}$$
- iii) H₂SO₄ (aq) + Na₂CO₃ (aq) → Na₂SO₄ (aq) + CO₂ (g) + H₂O (l)
- Mole ratio H⁺ : CO₃²⁻ ✓
- 1 : 1
- Moles of B (Na₂CO₃) = 0.07547 x 25

$$\frac{1000}{=0.001887} \checkmark \frac{1}{2}$$

Moles of D=0.001887

$$\text{Concentration of D} = \frac{0.001887 \times 250}{23.5} \checkmark \frac{1}{2}$$

$$= 0.02 \checkmark \frac{1}{2}$$

iv) $0.02 \equiv 25\text{cm}^3$
 $? \equiv 1000\text{cm}^3$

$$\frac{1000 \times 0.022}{25} = 0.8 \text{ moles/litre} \checkmark \frac{1}{2}$$

b) Complete table – (3mks)

All values -3 (realistic values above 20°C and below 40°C) 15 and above 2 otherwise (0mk)

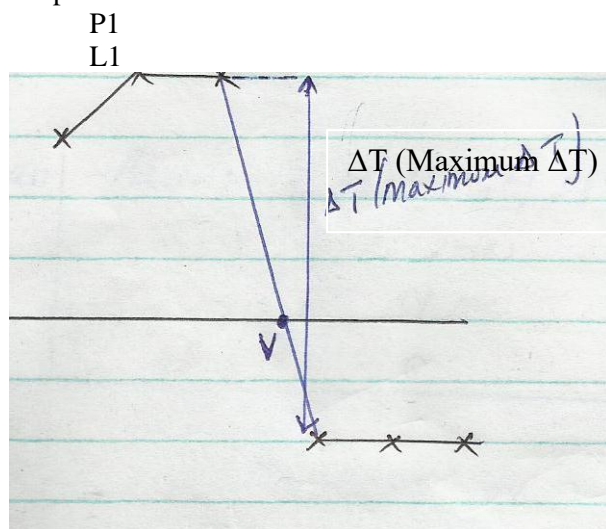
Decimal -1

Trend -1 (Increase their decrease)

Arithmetic -1

Total 6mks

(i) Graph – S1



ii) I. Max ΔT = shown above

II. Volume (V) shown above

$$\frac{\text{answ in (ii)} \times \text{answ in 1(iv)}}{1000}$$

ii) I.

II. Mass = (Answ in (ii) (II) + 14) x 1

ΔT = answ in (ii) I

$H1 = MC\theta T \checkmark 1$

$$\text{Molar enthalpy of reaction} = \frac{MC\Delta T}{\text{Answ}} \checkmark \frac{1}{2}$$

Q 2

(a) White ppt $\checkmark \frac{1}{2}$, soluble in excess

presence of Al^{3+} , Zn^{2+} , Pb^{2+}

All 3 correct 2marks

2 correct 1 mark

Otherwise 0

b) No white ppt $\checkmark 1$ formed

Pb^{2+} absent $\checkmark 1$ or Al^{3+} or Zn^{2+} present

To score Pb^{2+} must have been identified above

c) White ppt $\checkmark 1$ mark

Al^{3+} confirmed $\checkmark 1$ mark

Effervescence $\checkmark 1$ mk

d) colorless gas produced

NH_4^+ present $\checkmark 1$

- Gas turns red litmus paper $\checkmark \frac{1}{2}$ blue

(NH_3) Blue litmus remains blue $\checkmark \frac{1}{2}$

e) No white ppt formed $\checkmark 1$ mk

Absence of CO_3^{2-} , SO_3^{2-} , SO_4^{2-} or presence of Cl^-

Must indicate the absence of CO_3^{2-} , SO_3^{2-} , SO_4^{2-}

f) White ppt soluble on ✓ ½ warming ✓ ½

Cl^- confirmed ✓ 1mark