

SINGIDA REGION
FORM FOUR MOCK EXAMINATION 2023
CHEMISTRY 2A
ACTUAL PRACTICAL
MARKING SCHEME

1. Table results.(25cm³pipette)

Burette reading

Experiments	Pilot	I	II	III
Final burette reading (cm ³)	24.90	25.40	25.30	24.80
Initial burette reading (cm ³)	0.00	0.00	0.00	0.00
Volume used (cm ³)	24.90	25.40	25.30	24.80

AC =02 ,DEC =02, F=02 Total marks (06marks)

(a) (i) Average volume = $\frac{I + II + III}{3}$ (00 $\frac{1}{2}$ marks)

$$= \frac{25.40\text{cm}^3 + 25.30\text{cm}^3 + 24.80\text{cm}^3}{3} \text{ (00 } \frac{1}{2} \text{ marks)}$$

$$= 25.17 \text{ cm}^3$$

Therefore the mean titre volume = 25.17 cm³ (01 marks) **Total 2marks**

ii) Table results.(20cm³pipette)

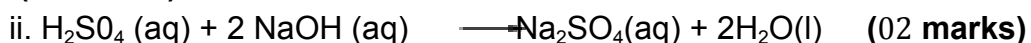
Burette reading

Experiments	Pilot	I	II	III
Final burette reading (cm ³)	20.40	20.20	20.30	20.10
Initial burette reading (cm ³)	0.00	0.00	0.00	0.00
Volume used (cm ³)	20.40	20.20	20.30	20.10

AC =02 ,DEC =02, F=02 Total marks (06marks)

(b) i. Any indicator . (01 marks)

Reason : Neutralization reaction involve a strong acid and a strong base.
 (01 marks)



iii. To increase the rate of reaction through mixing. (02 marks).

(c) i. **25cm³/20cm³** of acid required **25cm³/20cm³** of base for complete reaction.
 (01 marks).

ii. Data given

$$\text{Volume of acid (V}_a\text{)} = 25.17 \text{ cm}^3$$

$$\text{Volume of base (V}_b\text{)} = 25 \text{ cm}^3 \quad (00 \frac{1}{2} \text{ marks})$$

$$n_a = 1$$

$$n_b = 2$$

$$\text{Conc of impure Sulphuric acid} = \frac{3.5g}{0.5dm^3} = 7g/dm^3$$

$$\begin{aligned} \text{From Molarity (M}_b\text{)} &= \frac{\text{Concentration in g/dm}^3}{\text{Molar mass in g/mol}} \\ &= \frac{4g/dm^3}{40g/mol} = 0.1 \text{ M} \quad (01 \text{ marks}) \end{aligned}$$

Therefore, Molarity of base is 0.1 M. (01 marks)

Required : Molarity of acid (M_a)

From the formula

$$\frac{M_a V_a}{M_b V_b} = \frac{n_a}{n_b}$$

00 $\frac{1}{2}$ marks

$$M_a = \frac{M_b V_b n_a}{V_a n_b}$$

$$= \frac{0.1 \times 25 \times 1}{25.17 \times 2} = 0.05 \text{ M} \quad (01 \text{ marks})$$

Therefore Molarity of acid (M_a) = 0.05 M. (01 marks)

From

$$\text{Molarity} = \frac{\text{Conc in g/dm}^3}{\text{Molar Mass in g/mol}} \quad 00 \frac{1}{2} \text{ marks}$$

$$\begin{aligned} \text{Concentration (g/dm}^3\text{)} &= \text{Molarity} \times \text{Molar Mass} \quad (01 \text{ marks}) \\ &= 0.05 \text{ M} \times 98 \text{ g/mol.} \end{aligned}$$

$$= 4.9 \text{ g/mol.} \quad (01 \text{ marks})$$

$$\text{Percentage purity} = \frac{\text{Pure concentraion}}{\text{Impure concentration}} \times 100\% \quad 00 \frac{1}{2} \text{ marks}$$

$$= \frac{4.9g/dm^3}{7g/dm^3} \times 100\% = 70\% \quad (01 \text{ marks})$$

Therefore the percentage purity of Q = 70%. (01 marks)

TOTAL 25 Marks.

S/N	OBSERVATION	INFERENCE
a	Pale or light green (01 marks)	Fe ²⁺ may be present. (01 marks)
b	Insoluble (01 marks)	CO ₃ ²⁻ of Ca ²⁺ , Pb ²⁺ , Zn ²⁺ , Fe ²⁺ , Fe ³⁺ , Cu ²⁺ , may be present or
		SO ₄ ²⁻ of Ca ²⁺ , Pb ²⁺ may be present (01 marks)
c	Effervescence of colourless gas evolves, which turns lime water milky (01 marks)	CO ₃ ²⁻ , HCO ₃ ⁻ , may be present (01 marks)
d	No gas evolves (01 marks)	SO ₄ ²⁻ may be present. (01 marks)
e	i. Green precipitate is formed, insoluble in excess which turns brown on standing (01 marks)	Fe ²⁺ may be present (01 marks)
	ii. Green precipitate is formed, insoluble in excess. (01 marks)	Fe ²⁺ may be present (01 marks)
	iii. Deep blue precipitate formed. (01 marks)	Fe ²⁺ confirmed. (01 marks)
	iv. White precipitate insoluble (01 marks)	SO ₄ ²⁻ confirmed. (01 marks)

2.

CONCLUSION.

- The cation in sample **S** is **Fe²⁺** (01 marks)
 - The Anion in sample **S** is **SO₄²⁻** (01 marks)
 - The compound **S** is **FeSO₄**
- FeSO₄(aq) + 2 HCl (aq) → FeCl₂ (aq) + H₂SO₄ (aq) (01 marks)
- Two chemical properties of sulphur .
 - React with metals to give metal sulphides
 - Act as a reducing agent when react with strong concentrated acids.

@ (01 marks) =(02 marks)

Two chemical properties of oxygen.

 - React with metals to form basic oxides .
 - React with non-metals to form acidic oxides.
 - React with hydrogen to produce water .

@ (01 marks) =(02 marks)
- One use of FeSO₄
 - Used in medicine to treat iron deficiency.
 - used in sewage treatment
 - production of paints
 - Used in laboratory for the brown ring test.

- coagulation of blood in slaughter houses
- production of weed killers and fungicides.

Any point @ @ (01 marks) =(01 mark)

TOTAL 25 MARKS