

**THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATION EXAMINATION**

732/2B

**CHEMISTRY 2B
(ACTUAL PRACTICAL B)**

Time: 3 Hours

ANSWERS

Year: 2015

Instructions.

1. This paper consists of **three (3)** questions.
2. Answer **all** questions
3. Question number 1 carries 20 marks and the rest carry 30 marks.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

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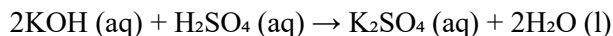
1. You are provided with:

- **R1:** Potassium hydroxide (unknown concentration)
- **R2:** Sulphuric acid, 0.05 mol/dm³
- Phenolphthalein indicator

(a) The colour change observed at the end point is **pink to colourless**, indicating the base (R1) has been neutralized by the acid.

(b) Average volume of R2 used = **25.0 cm³**

(c) Balanced chemical equation:



(d) Moles of H₂SO₄ used = 0.05 mol/dm³ × 25.0 cm³ ÷ 1000 = **0.00125 mol**

(e) From the equation, 1 mol H₂SO₄ reacts with 2 mol KOH

So, moles of KOH = 0.00125 mol × 2 = **0.0025 mol**

(f) Volume of R1 used = 25.0 cm³ = 0.025 dm³

Concentration of R1 = 0.0025 ÷ 0.025 = **0.1 mol/dm³**

(g) Molar mass of KOH = 39 + 16 + 1 = 56 g/mol

Concentration in g/dm³ = 0.1 mol/dm³ × 56 g/mol = **5.6 g/dm³**

2. You are given:

- T1: sodium thiosulphate
- T2: hydrochloric acid

(a) The mark “+” disappears due to the formation of **sulfur precipitate**, which makes the solution cloudy and blocks the mark from view.

(b) Completed table:

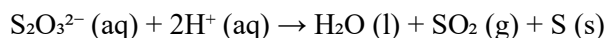
Experiment	T1 (cm ³)	Water (cm ³)	T2 (cm ³)	Time (s)
1	10	0	10	22
2	8	2	10	28
3	6	4	10	35
4	4	6	10	48
5	2	8	10	70

(c)

Balanced chemical equation:



Ionic equation:



(d) As the concentration of T1 (sodium thiosulphate) decreases, the **rate of reaction decreases**, leading to **longer reaction times**.

(e) Precautions:

- Ensure all solutions are measured accurately using clean apparatus
- Start timing immediately after mixing the reactants to get reliable time readings

3. You are given salt **Z**.

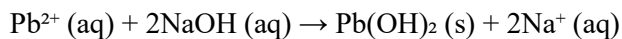
(i) Observations and inferences:

Test	Observation	Inference
Appearance	White crystalline solid	Ionic salt
Heating	Brown fumes, smell of NO ₂	Presence of nitrate
Solubility	Soluble in water	Confirms ionic nature
NaOH (few drops)	White precipitate formed	Possibly Pb ²⁺ or Al ³⁺
NaOH (excess)	Precipitate remains insoluble	Confirms Pb ²⁺
Ammonia (few drops)	White precipitate	Confirms Pb ²⁺
Ammonia (excess)	No change	Confirms Pb ²⁺
BaCl ₂ + HCl	No precipitate	No sulfate or carbonate
AgNO ₃ + HNO ₃	No precipitate	No halide present

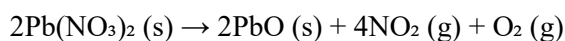
(ii) Cation is **Pb²⁺**, anion is **NO₃⁻**, hence the salt is **lead(II) nitrate (Pb(NO₃)₂)**.

(iii)

With NaOH:



With heat:



(iv) To distinguish it from a chloride, **add AgNO₃** to a fresh solution:

- A chloride would form a **white precipitate** of AgCl
- Nitrate gives **no precipitate**, confirming it is not a chloride