

Name:Index No.....

Signature:.....

School:

P525/3

Chemistry Practical

Paper 3

July/August,2023

3 ¼ Hours



**PROVINCIAL - NAMIREMBE DIOCESE
COUHEIA SECONDARY
MOCK EXAMINATIONS 2023**



Uganda Advanced Certificate of Education

CHEMISTRY P525/3

PAPER 3

Time: 3 Hours 15 minutes

INSTRUCTIONS TO CANDIDATES

- ✓ *This paper consists of **three** compulsory questions*
- ✓ *Attempt **all** questions. Answer are to be written in the spaces provided.*
- ✓ *All working must be clearly shown.*
- ✓ *Reference books (i.e text books, books on qualitative analysis, etc) should not be used.*
- ✓ *Candidates are not allowed to starts working with the apparatus for the first 15 minutes. This time is to enable candidates to read the question paper and make sure they have all the apparatus and chemicals that they may need.*

FOR EXAMINER'S USE ONLY		
<i>Question 1</i>		
<i>Question 2</i>		
<i>Question 3</i>		
Total		

1. You are provided with the following:

FA, which is a solution 3.16 g l^{-1} of potassium Manganate(VII).

FA2, which is a solution of diammonium iron (II) sulphate – 6 – water
Solid **W**, which is impure potassium chlorate (V), **KClO₃**.

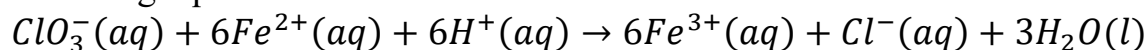
2M sulphuric acid

A thermometer.

You are required to standardize solution **FA2** and then determine the percentage of potassium chloride in solid **W**.

Theory

In acidic medium, chlorate(V) ions oxidize(II) ions according to the following equation.



Procedure A.

- (a) Pipette 10.0 cm^3 of **FA2** into a clean conical flask followed by an equal volume of 2M sulphuric acid and then titrate the mixture with **FA1** from the burette until the end point. Repeat the titration until you obtain consistent results.

Record your results in the **Table I** below;

Results:

Volume of pipette used = cm^3

Table I

	I	II	III
Experiment number			
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of FA1 used (cm^3)			

Volume of **FA1** used in a calculating average volume.

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Average volume of **FA1** used cm^3 .

Questions:

- (a) Calculate the number of moles of diammonium iron(II) sulphate – 6 water dissolved one litre of solution of **FA2**. (K =39,0=16, Mn =55)

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Procedure B:

- (c) Weigh accurately about 0.5g of **W** and place it in about 100 cm³ of distilled water. Stir to dissolve. Transfer the resultant solution and the washings into a 250cm³ volumetric flask and make it up to the mark with distilled water. Label the resultant solution **FA3**.
- (d) Pipette 10.0 cm³ of **FA3** into a clean conical flask. Add 25 cm³ of **FA2** using a measuring cylinder followed an equal volume of 2M sulphuric acid. Heat the mixture to about 85⁰C and then cool in cold water for

about 3 minutes. Titrate the cold mixture with **FA1** from the burette until the end point.

Repeat the titration until you obtain consistent results.

Record your results in the table II below;

Results:

Mass of weighing bottle + **W** =..... g.

Mass of weighing bottle alone =g.

Mass of **W** =g.

Volume of pipette used =cm³.

Table II

Experiment number	I	II	III
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of FA1 used (cm ³)			

Volume of **FA1 used** in calculating the average volume

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Average volume of **FA1** usedcm³

Questions:

(c) Calculate the number of moles of

(i) excess iron(II) ions in **FA2** that reacted with manganate(VII) ions.

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(i) Iron(II) ions that reacted with 10cm³ of chlorate(V) ions in **FA3**.

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(f) Determine the percentage of potassium chloride in solid **W**
(**K = 39, Cl = 35.5, O = 16**)

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2. You are provided with substance **Y** which contains **three** cations and **anion** anion. You are required to determine the cations and anions in **Y**. Carry out the following tests on **Y** and record your observations and deductions in the table below. Where a gas is evolved, it must be identified.

Tests	Observations	Deductions
(a) Heat two spatula endful of Y in a hard test tube, first gently and then strongly until no further change.		
(b) To two spatula endful of Y in a boiling tube, add about 3cm ³ of water and shake vigorously. Then add dilute Sodium hydroxide solution dropwise until in excess. Warm the mixture and filter. Keep both the filtrate and residue.		
(d) To the filtrate from part (b), add dilute nitric acid dropwise until the solution is just acidic.		

<p>Divide the resultant acidic solution into six parts.</p> <p>(i) To the first part of the acidic solution, add dilute sodium hydroxide solution dropwise until in excess. Warm the mixture.</p>		
<p>(i) To the second part of the acidic solution, add dilute ammonia solution dropwise until in excess.</p>		
<p>(ii) To the third part of the acidic solution, add 2-3 drops of potassium iodide solution.</p>		
<p>(iii) To the fourth part of the acidic solution, add 2- 3 drops of litmus solution followed by dilute ammonia solution dropwise until in excess.</p>		
<p>(iv) To the fifth part of the acidic solution, add 2-3 drops of lead(II) nitrate solution and heat the mixture.</p>		
<p>(v) Use the sixth part of the acidic solution to carry out a test of your choice to confirm one of the anions in Y.</p>		

(e) Wash the residue from (b) and place it in a boiling tube. Add dilute hydrochloric acid until no further change. Divide the resultant acidic solution into four parts.		
(i) To the first part of the acidic solution, add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the second part of the acidic solution, add dilute ammonia solution dropwise until in excess.		
(iii) To the third part of the acidic solution, add a half spatula of zinc powder and warm. Leave it to stand.		
(iv) Use the fourth part of the acidic solution to carry out a test of your own choice to confirm one of the cations in Y		

- (e) Identify the;
 (i) Cations in **Y**and
 (ii) Anion in **Y**

3. You are provided with organic compound **P**. You are required to determine the functional group of **P**. Carry out the following tests on **P** and record your observations and deductions in the table below. Where a gas is evolved it must be identified.

Tests	Observations	Deductions
(a) Burn a small amount of P on a spatula end or on a porcelain dish.		
(b) To about 1cm ³ of P add about 1 cm ³ of dilute sodium hydroxide solution		
(c) Shake about 2cm ³ of P in a test tube with 3cm ³ of water. Test the resultant mixture with litmus. Divide the resultant mixture into five parts.		
(i) To the first part of the solution, add 2-3 drops of sodium hydrogen carbonate solution.		
(ii) To the second part of the solution, add 3 -4 drops of neutral iron (III) chloride solution.		

(iii) To the third part of the solution, add about 3 -4 drops Brady's reagent.		
(iv) To the fourth part of the solution, add about 2 -3 drops of acidified potassium dichromate(VI) solution and warm.		
(v) To the fifth part of the solution, add about 1cm ³ of iodine solution followed by dropwise addition of Sodium hydroxide solution until the solution is pale yellow. Warm and allow to stand.		

(f) Comment on the nature of **P**

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END