

Name of School:.....

Candidate's Name:.....

Centre No./Index No: Signature:.....

P525/3

CHEMISTRY

Paper 3

July - August

3 ¼ Hours



ELITE EXAMINATION BUREAU MOCK 2019

Uganda Advanced Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

3 Hours 15 Minutes

Instructions to the Candidates:

- Answer **all** questions in this paper.
- All answers must be written in the spaces provided only.
- Reference text books are not allowed.
- Mathematical tables and silent non-programmable calculators may be used.
- Candidates are not allowed to start working within the first 15 minutes. This time is for checking the materials and apparatus required.

(Where necessary use C = 12, O = 16, H = 1, R = 122.5)

<i>For examiners use only</i>			
<i>Question 1</i>	<i>Question 2</i>	<i>Question 3</i>	<i>Total</i>

Turn Over

- You are provided with the following;

FA1, which is approximately a 0.02M Potassium manganate (VII) solution.

FA2, which is a solution made by dissolving 9.8g of Ammonium ferrous sulphate crystals $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$ to make 250cm^3 of solution.

Solid R which contains an oxidizing agent.

1M Sulphuric acid solution.

You are required to standardize **FA1** and use it to determine the mole ratio of the reaction between **R** and Fe^{2+} ions.

In acidic medium, both **R** and Manganate (VII) ions react with Iron(II) ions

PROCEDURE

- Pipette 20.0 or 25.0cm^3 of **FA2** into a conical flask and add an equal volume of 1M sulphuric acid using a measuring cylinder.

Titrate the resultant solution with **FA1** until the end point.

Repeat the titration until you obtain consistent results

- Record your results in **table I** below.

Results

Volume of pipette used cm. (1/2 marks)

Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of FA1 used (cm^3)			

(4½ marks)

- Volume of **FA1** used for calculating average volume. (½ mark)

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- Average volume of **FA1** used cm^3 . (2 ½ marks)

Questions

- Calculate the number of moles of Fe^{2+} ions in **FA2** that reacted. (2marks)

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(b) Determine the concentration of **FA1** in mol dm^{-3} . (3 ½ marks)

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Procedure

(b) Weigh accurately about 0.2g of **R**. Dissolve it in a minimum amount of distilled water and transfer the solution into a 250cm^3 volumetric flask. Add 50cm^3 of 1M sulphuric acid followed by 150cm^3 of **FA2** and shake mixture.

Make the solution upto the mark with distilled water and label it **FA3**.

Pipette 25.0 (or 20.0) cm^3 of **FA3** into a conical flask and add an equal volume of 1M Sulphuric acid using a measuring cylinder.

Titrate the resultant solution with **FA1** until the end point.

Repeat the titration until you obtain consistent results.

i) Record your results in **table II** below.

Results

Mass of weighing bottle + **R** g (½ mark)

Mass of empty weighing bottle g (½ mark)

Mass of **R** used g (½ mark)

Volume of pipette used cm^3 (½ mark)

Table II

Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of FA1 used (cm^3)			

(4 ½ marks)

(ii) Volumes of **FA1** used for calculating average volume.

..... cm^3 . (1/2 mark)

(iii) Average volume of **FA1** used cm^3 (2 1/2 marks)

Questions

(a) Calculate the number of moles of Manganate(VII) ions that reacted with **FA3**.
(1mark)

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(b) Determine the;
(i) Number of moles of Iron(II) ions in 250cm^3 of **FA3**. (2 1/2 marks)

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(ii) Number of moles of Iron(II)ions that reacted with **R**. (2marks)

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(iii) Mole ratio of **R** to Iron (II) ions. (2 1/2 marks)

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2. You are provided with substance **Q** which contains two cations and two anions. You are required to carry out tests below on **Q** to identify the cations and anions in **Q**. Identify any gas(es) evolved.
Record your observations and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat two spatula endfuls of Q strongly in a dry test tube until there is no further change.		
(b) To two spatula end-fuls of Q , add about 4cm ³ of distilled water and shake well. Filter the mixture and divide the filtrate into four portions.		
(i) To the first portion, add Lead(II) nitrate solution followed by dilute nitric acid.		
(ii) to the second portion, add Barium nitrate solution followed by dilute nitric acid.		
(iii) To the third portion,		

add 3 drops of acidified potassium permanganate solution.		
(iv) To the fourth portion, add silver nitrate solution followed by excess aqueous ammonia.		
(c) Wash the residue with distilled water and add dilute nitric acid. Warm to dissolve. To the resultant solution add aqueous ammonia dropwise until in excess. Filter the mixture and keep both the filtrate and residue.		
(d) Acidify the filtrate with dilute nitric acid. Divide the ACIDIC solution into three parts. (i) To the first part, add sodium hydroxide solution dropwise until in excess.		
(ii) To the second part, add aqueous ammonia until in excess.		
(iii) Use the third part to carry out a test of your own choice to confirm the cation in Q .		
(e) Dissolve the residue		

from (c) above in a minimum volume of dilute nitric acid. Divide the resultant solution into four portions.		
(i) To the first portion, add sodium hydroxide solution dropwise until in excess.		
(ii) To the second portion, add ammonia solution drop-wise until in excess.		
(iii) To the third portion, add 3 drops of dilute hydrochloric acid and heat the mixture. Allow to cool.		
(iv) To the fourth portion, add Potassium chromate(VI) solution followed by excess Sodium hydroxide solution.		

Questions:

Identify the

- (i) Cations in **Q** and
- (ii) Anions in **Q** and

3. You are provided with an organic compound **S**. You are required to carry out tests below on **S** and describe the nature of **S**

Record your observation and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Burn a little of S on a spatula end or in a dry porcelain dish.		
(b) To a spatula endful of S add about 5cm ³ of distilled water and shake the mixture. Divide the resultant into four parts		
(i) To the first part, add litmus solution.		
(ii) To the second part, add 3 drops of acidified potassium Manganate(VII) solution		
(iii) To the third part, add Neutral Iron(III) chloride solution.		
(iv) To the fourth part, add sodium carbonate solution.		
(c) To a little of S add about 3cm ³ of ethanol and shake the mixture. Divide the resultant solution in two parts.		
(i) To the first part, add 3 drops of Brady's reagent.		

(ii) To the second part, add 4 drops of concentrated sulphuric acid and heat the mixture. Pour the product in a beaker of cold water.		

d) Describe the nature of **S**.

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END