

Candidate's Name:..... Index No:

Signature..... School

P525/3

CHEMISTRY

Paper 3

July/August, 2019

3¼ hours

BUGANDA EXAMINATION COUNCIL MOCKS – 2019

CHEMISTRY

PRACTICAL

Paper 3

3 hours 15minutes

INSTRUCTIONS TO CANDIDATES

- ✓ Answer **ALL** questions. Use **blue** or **black** ball point pen. Any work done in pencil will **not** be marked except drawings.
- ✓ Record your answers on this question paper in the spaces provided.
- ✓ Mathematical tables and silent non-programmable calculators may be used.
- ✓ Reference books (i.e. text books, Books on qualitative analysis, etc) should **not** be used.
- ✓ Candidates are **not** allowed to start 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 Examiners' Use Only			
Q.1	Q.2	Q.3	Total

Turn Over

1. You are provided with the following;

FA1; which is a solution containing 5.6 g l^{-1} of iron(II) ions.

FA2; which is a solution of potassium manganate(VII) of unknown concentration.

Solid **R**, which is a salt containing persulphate ions.

1 M sulphuric acid solution.

You are required to standardize **FA2** and use it to determine the reaction ratio between iron(II) ions in **FA1** and solid **R**.

In acidic medium, potassium manganate(VII) reacts with iron(II) ions in the ratio of 1: 5

PROCEDURE:

(a) Pipette 25.0 (or 20.0) cm^3 of **FA1** into a conical flask and add 20 cm^3 of 1 M sulphuric acid using a clean measuring cylinder.

Shake the mixture and titrate the mixture with **FA2**.

Repeat the titration until you obtain consistent results.

(i) Record your results in the **Table I** below.

RESULTS:

Volume of pipette used = cm^3 (½ mark)

Table I

Experiment	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume FA2 used (cm^3)			

(4½ marks)

(ii) Volumes of **FA2** used for calculating the average volume. (½ mark)

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(iii) Average volume of **FA2** used cm^3
(2½ marks)

Questions:

(b) Calculate the molar concentration of potassium manganate(VII) in **FA2**.

($Fe = 56$) (4½ marks)

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PROCEDURE:

- (c) Weigh accurately about 0.5 g of **R**. Add about 50 cm³ of distilled water, carefully shake to dissolve and transfer the solution into a 250 cm³ volumetric flask. Using a clean measuring cylinder, add exactly 150 cm³ of **FA1** to the solution in the volumetric flask. Make the solution up to the mark with distilled water, shake well and label it **FA3**.
 Pipette 25.0 (or 20.0) cm³ of **FA3** into a conical flask add 10 cm³ of 1 M sulphuric acid using a measuring cylinder.
 Shake the mixture and titrate the mixture with **FA2**.
 Repeat the titration until you obtain consistent results.
 (iv) Record your results in the **Table II** below.

RESULTS:

Mass of weighing container + **R** = g (½ mark)
 Mass of empty weighing bottle = g (½ mark)
 Mass of **R** used =g (½ mark)
 Volume of pipette used cm³ (½ mark)

Table II

Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of FA2 used (cm ³)			

(4½ marks)

- (v) Volumes of **FA2** used for calculating the average volume

..... cm³ (½ mark)

- (vi) Average volume of **FA2** used..... cm³

(2½ marks)

Questions

- (d) Calculate the number of moles of

- (v) iron(II) ions that reacted manganate(VII) ions in **FA2**. (2½ marks)

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(vi) iron(II) ions in 250 cm³ of **FA3**.

(1½ marks)

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(vii) iron(II) ions that reacted with solid **R**.

(02 marks)

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(e) Determine the reaction ratio between iron(II) ions in **FA1** and solid **R**.

(RFM of R= 270)

(02 marks)

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2. You are provided with substance **Z**, which contains **two** cations and **two** anions. You are required to carry out tests below on **Z** and identify the cations and anions in **Z**.

Identify any gas(es) evolved.

Record your observations and deductions in the table below.

(32 marks)

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat two spatula end-fuls of Z strongly in a dry test tube until there is no further change.		

(b) To about 6 cm ³ of water, add 2 spatula end-fuls of Z and shake well. Filter the mixture and keep both filtrate and residue.		
(c) Divide the filtrate into five parts. (i) To the first part of the filtrate, add dilute sodium hydroxide solution dropwise until in excess.		
(ii) To the second part of the filtrate, add dilute ammonia solution dropwise until in excess.		
(iii) Use the third part of the filtrate, to carry out a test of your own choice so as to confirm the first cation in Z .		
(iv) To the fourth part of the filtrate, add 2-3 drops of lead(II) nitrate solution and heat the mixture.		
(v) Use the fifth part of the filtrate, to carry out a test of your own choice so as to confirm the first anion in Z .		

(d) Wash the residue from (b) with distilled water and then add dilute hydrochloric acid until there is no further change. Divide the acidic solution into three 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 drop wise until in excess.		
(iii) Use the third part of the acidic solution, to carry out a test of your own choice so as to confirm the second cation in Z .		

Questions:

(e) Identify the

(i) cations in **Z**

(ii) anions in **Z**

3. You are provided with an organic compound **W**.

You are required to carry out tests below on **W** and describe the nature of **W**. Record your observations and deductions in the table below. (18 marks)

Tests	Observations	Deductions
(a) Burn a small amount of W on a spatula end or in a dry porcelain dish.		
(b) To about 1 cm ³ of W , add 2 cm ³ of water, shake and test with a litmus paper. Divide the mixture into three parts.		
(i) To the first part of the mixture, add 3-4 drops of sodium hydrogencarbonate solution.		
(ii) To the second part of the mixture, add 4-5 drops of neutral iron(III) chloride solution.		
(iii) To the third part of the mixture add 3-4 drops of 2,4-dinitrophenylhydrazine		
(c) To about 0.5 cm ³ of W , add about 1 cm ³ of acidified potassium dichromate(VI) solution. Then add 5 drops of 2,4-dinitrophenylhydrazine and shake. Leave it stand for about 1 minute.		

(d) To about 0.5 cm ³ of W , add about 1 cm ³ of ethanoic acid followed by 2-3 drops of concentrated sulphuric acid. Heat the mixture and the pour in a small beaker of cold water.		
(e) To about 0.5 cm ³ of W , add 4 drops of Lucas reagent.		
(f) To about 0.5 cm ³ of W , add 4 cm ³ of iodine solution followed by sodium hydroxide solution until the solution is pale yellow. Warm the mixture gently and allow it to cool under cold water.		

(f) Describe the nature of **W**.

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END