

Candidates Name:

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Signature:

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P525/3

CHEMISTRY

(PRACTICAL)

Paper3

JAN 2021 $3\frac{1}{4}$

hours

POST MOCK EXAMINATIONS 2021
Uganda Advanced Certificate of Education
CHEMISTRY PRACTICAL

PAPER 3 3hours

15 minutes

INSTRUCTION TO CANDIDATES:

Answer **all** questions.

Record your answers on this paper in the **spaces provided**.

Candidates are not allowed to start working with 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.

Candidates may use the following atomic masses (**K=39,O=16,Cl=35.5,**)

For examiners use only			
Q.1	Q.2	Q.3	TOTAL

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QUESTION ONE

You are provided with the following

FA1 which is potassium manganate (VII) solution.

FA2 which is a solution prepared by dissolving 0.5g of halate (V), KXO_3 in 250cm^3 of water.

FA3 which is a solution of 2.0M sulphuric acid

Solid K which is diammonium Iron(II) sulphate $(\text{NH}_4)_2\text{SO}_4\text{FeSO}_4 \cdot 6\text{H}_2\text{O}$

You are required to determine the (i) molar concentration of FA1

(ii) Relative atomic mass of X in KXO_3

THEORY

Both acidified Manganate (VII) ions and Halate (V) ions oxidize Iron (II) ions according to the following equations.



PROCEDURE A

Weigh accurately about 6.0g of **solid K** and dissolve it in 100cm^3 of distilled water transfer the resultant solution in a 250cm^3 volumetric flask. Make the solution to the mark by adding distilled water to the mark. Label this solution **FA4**.

RESULTS

Mass of weighing container + solid K.....g $\left(\frac{1}{2}\text{Mark}\right)$

Mass of weighing container alone g $\left(\frac{1}{2}\text{Mark}\right)$

Mass of solid K g $\left(\frac{1}{2}\text{Mark}\right)$

PROCEDURE B

Pipette 25cm³(or 20 cm³) of **FA4** into a conical flask add equal volume of **FA3**. And titrate the mixture with **FA1** from the burette. Repeat the titration until you obtain consistence results record your results in the table below.

Volume of pipette used.....(cm^3) $\frac{1}{2}$ Mark)

Final burette reading/cm ³			
Initial burette reading/cm ³			
Volume of FA1 used/cm ³			

Volume of **FA1** to be used to calculate average volume

.....(cm^3) ($\frac{1}{2}$ Mark)

Calculate the Average volume of **FA1**

.....(cm^3)($2\frac{1}{2}$ Mark)

(a)Determine the

i) Molar concentration of Iron (II) ions in FA4

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 $(2\frac{1}{2}$ Mark)

ii)the moles of manganate(VII) ion that reacted with iron(II) ions

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(2Marks)

ii) Molar concentration of potassium manganate (VII) ions.

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(1½ Marks)

PROCEDURE C

Using a measuring cylinder measure 10cm³ of **FA2** into a conical flask .and 35cm³ of **FA4** followed by 25cm³ of **FA3**.Heat the mixture to about 80°C allow to cool. Titrate the cold mixture with **FA1** from the burette. Repeat the titration until you obtain consistence results record your results in the table below

Final burette reading/cm ³			
Initial burette reading/cm ³			
Volume of FA1 used/cm ³			

Volume of **FA1** to be used to calculate average volume

.....(cm³) (½ Mark)

Calculate the Average volume of **FA1**

.....(cm³)(2½ Marks)

Questions:

b) Calculate the number of moles of:

i) Un-reacted iron (II) ions in FA4 that reacted with manganate(VII) ions (1½ Marks)

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ii) Iron (II) ions that reacted with 10cm³ of halate (V) in FA2

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..... (1½ Marks)

iii) XO₃⁻ in 10 cm³ that reacted with iron(II) ions.

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..... (1Mark)

c) Determine the

i) Molar mass of potassium halate (V)

(1½ Marks)

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ii) Relative atomic mass of X in KXO_3

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..... (1Mark)

Question two

You are provided with substance **W** which contains **two** cations and **two** anions. You are required to carry out the following tests on **W** and identify the anions and cations in it. **(33marks)**

Record your observations and deductions in the table below

	TESTS	OBSERVATIONS	DEDUCTIONS
(a)	Heat two spatula end-fuls of W strongly in a dry test tube.		

(b)	Dissolve three spatula endful of W in about 10cm ³ of dilute nitric acid		
(c)	To the resultant solution in (b) add dilute sodium hydroxide drop-wise till no further change Shake strongly then filter keep both the filtrate and residue		
(c)	To the filtrate, add dilute nitric acid until the solution is just acidic , divide the acidic solution into four parts		
(i)	To the first part add dilute sodium hydroxide solution drop-wise till in excess		
(ii)	To the second part add dilute ammonia solution drop-wise till in excess		
(iii)	To the third part of acidified solution and 1-2 drops of dilute sulphuric acid		

(iv)	To the fourth part of acidified solution and 1-2 drops of potassium chromate followed by dilute sodium hydroxide till in excess		
(d)	Dissolve the residue in dilute nitric acid and divide the resultant solution into three part		
(i)	To the first part add dilute sodium hydroxide solution drop-wise till in excess		
(ii)	To the second part add ammonia solution drop-wise till in excess		

(iii)	To the third part of add little solid ammonium chloride followed by disodium hydrogen phosphate then ammonia solution drop-wise till in excess		
(e)	Shake one spatula endful of W with about 10cm ³ of water then filter, discard the residue divide the filtrate into four portions		
(i)	To first portion of solution add 2-3drops of barium nitrate solution		
(ii)	To second portion of solution add 1-2drops of lead(II) nitrate solution followed by dilute nitric acid		
(iii)	To third portion of solution add 2-3 drops of silver nitrate solution followed by dilute ammonia solution		
(iv)	Use the fourth portion of solution to carry a test of your own to confirm the second anion		

(e) Identify the

(i) Cations in W

.....

(ii) Anions in W

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QUESTION THREE

You are provided with substance **M** which is an organic compound. You are required to determine the nature of **M**. Carry out the following tests on **M** and record your observations and deductions in the table below. **(20marks)**

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Burn a small amount of M On a spatula end or In a porcelain dish		

(b) Shake 0.5cm^3 of M with about 1cm^3 of water and test the solution with litmus paper		
c) To about 0.5cm^3 of M add about 2cm^3 iodine solution followed by sodium hydroxide drop-wise till brown solution is just discharged warm and Allow cool.		
(d) To about 2-3 drops of M Add few drops of Brady's Reagent.		
e) To about 1cm^3 of M add 5 drops of Acidified potassium dichromate and heat.		

(f) To about 1cm ³ of M add about 1cm ³ of ethanoic acid followed 5 by drops of Concentrated sulphuric acid and heat allow to cool.		
g)To about 1cm ³ of M add about 2cm ³ of lucus reagent and shake		
h)to about 1cm ³ of M add 2-3 drops of concentrated sulphuric acid and heat carefully pass the vapour give off in about 1cm ³ acidified potassium permanganate		

(d)Comment on the nature of **M**

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END

CONFIDENTIAL

Question; one

FA1 3.0g of KMnO_4 IN 1000cm^3 of water (each 100cm^3)

FA2 2.0 g of KClO_3 IN 1000cm^3 of water (each 10cm^3)

FA3 2.0M H_2SO_4 (each 150cm^3)

SOLID K, $(\text{NH}_4)_2\text{SO}_4\text{FeSO}_4 \cdot 6\text{H}_2\text{O}$ (each 6.0g)

Question two

Mixture of PbCO_3 , MgCO_3 and Na_2SO_3 in the ration 8:4:1

Question three:

2-methyl propan-2-ol

