**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**

3Hours 15Minutes

**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)*

|  |  |  |  |
| --- | --- | --- | --- |
| ***For examiners use only*** | | | |
| ***Question 1*** | **Question 2** | ***Question 3*** | ***Total*** |
|  |  |  |  |
|  |  |  |  |

**Turn Over**

1. 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 **(NH4)2Fe(SO4)2.6H2O** to make 250cm3 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 **Fe2+** ions.

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

**PROCEDURE**

(a) Pipette 20.0 or 25.0cm3 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

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

**Results**

Volume of pipette used …………………………………………… cm. (½ marks)

|  |  |  |  |
| --- | --- | --- | --- |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of **FA1** used (cm3) |  |  |  |

(4½ marks)

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

…………………………………………………………………………………………………

1. Average volume of **FA1** used …………………………… cm3. (2 ½ marks)

**Questions**

1. Calculate the number of moles of **Fe2+** ions in **FA2** that reacted. (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Determine the concentration of **FA1** in moldm-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 250cm3 volumetric flask. Add 50cm3 of 1M sulphuric acid followed by 150cm3 of **FA2** and shake mixture.

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

Pipette 25.0 (or 20.0)cm3 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.

1. 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 ………………………………………………. cm3 (½ mark)

**Table II**

|  |  |  |  |
| --- | --- | --- | --- |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of **FA1** used (cm3) |  |  |  |

1. ½ marks)

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

………………………………………………………………………………………. cm3. ( ½ mark)

(iii) Average volume of **FA1** used …………………………………… cm3 (2 ½ marks)

**Questions**

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

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Determine the;

(i) Number of moles of Iron (II) ions in 250cm3 of **FA3**. (2 ½ marks)

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

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(iii) Mole ratio of **R** to Iron (II) ions. (2 ½ 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 4cm3 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 drowise 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

1. Cations in **Q** ………………………………… and ………………………………..
2. 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 5cm3 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 3cm3 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**