**P525/3**

**CHEMISTRY**

**Paper 3**

**Jul/Aug 2016**

**3 ¼ Hours**

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**MUKONO EXAMINATIONS COUNCIL**

**Uganda Advanced Certificate of Education**

**CHEMISTRY PRACTICAL**

Paper 3

**3 Hours 15 Minutes**

**INSTRUCTIONS TO CANDIDATES**

* *The paper consists of* ***three (3)*** *compulsory questions*
* *Answer* ***all*** *questions in the spaces provided.*
* *No additional answer sheets will be provided.*

1. You are provided with the following;

**FA1,** which is a solution containing 6.6g per litre of sodium oxalate, Na2C2O4.

**FA2,** potassium manganate (VII) solution which is approximately 0.02moldm-3.

**FA3**, which is a solution of hydrogen peroxide.

2M sulphuric acid solution.

You are required to;

(i) Standardise the potassium manganite (VII) solution

(ii) Determine the concentration of hydrogen peroxide in moldm-3 in FA3

**Procedure**

**PART A**

a) Pipette 25cm3 of FA1 into a conical flask, then add an equal volume of 2M sulphuric

acid and warm the mixture to about 70°C.

Titrate the mixture until you obtain a permanent faint pink colour.

Repeat the titration 2-3 times until you get consistent results.

Enter your results in table 1 below

volume of pipette………………………………….cm3 ***( ½ mark)***

|  |  |  |  |
| --- | --- | --- | --- |
| Experiments | 1 | 2 | 3 |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of FA2 used (cm3) |  |  |  |

***(03marks)***

Values used for calculating average volume of FA2 used: ***( ½ mark)***

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Average volume of FA2 ***(2 ½ marks)***

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**Questions**

b) Calculate the concentration in moldm-3 of potassium manganate (VII) solution in

FA2. [C2O42- : MnO4- is 5:2] ***(02marks)***

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**PART B**

c) Using a measuring cylinder, transfer 10.0cm3 of FA3 into a 250cm3 volumetric flask

and make it to the mark with distilled water. Label resultant solution FA4.

Pipette 10.0cm3 of FA4 into a conical flask, then add about 10cm3 of 2M sulphuric acid and then titrate with FA2 from the burette until you obtain a permanent faint pink colour.

Repeat the titration 2-3 times until you get consistent results.

Enter your results in table II below.

Volume of pipette ………………………………………..cm3 ***( ½ mark)***

|  |  |  |  |
| --- | --- | --- | --- |
| Experiments | 1 | 2 | 3 |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of FA2 used (cm3) |  |  |  |

***(03marks)***

Values used for calculating average volume of FA2 used. ***( ½ marks)***

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

Average volume of FA2 ***(2 ½ marks)***

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

d) Write the equation of reaction between acidified manganate (VII) ions MnO4- and

hydrogen peroxide.

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e) Calculate the concentration in moldm-3 of hydrogen peroxide in

(i) FA4 ***(4 ½ marks)***

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(ii) FA3

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1. You are provided with substance X which contains **two** cations and **two** anions. Carry out the following tests on X and record your results, in the table below. Where a gas is evolved, it must be identified.

|  |  |  |
| --- | --- | --- |
| **TESTS** | **OBSERVATIONS** | **DEDUCTIONS** |
| a) Heat two spatula endfuls of X in a dry test tube strongly until there is no further change. |  |  |
| b) Transfer three spatula endfuls of X in a dry test tube and add about 5cm3 of distilled water. Shake and filter. Keep both the filtrate and residue. |  |  |
| Divide the filtrate into three portions.  i) To the first portion add 3-4 drops of barium nitrate solution |  |  |
| ii) To the second portion, add 3 drops of silver nitrate solution followed by excess of dilute nitric acid solution. |  |  |
| iii) To the third portion, add reagent of your own choice to confirm the anion in the filtrate. |  |  |
| c) Transfer residue from part (b) into a boiling tube and then add dilute nitric acid until there is no further change. To the resultant solution, add excess NaOH solution, shake and filter. |  |  |
| d) Acidify the filtrate from part (c) with dilute nitric acid and divide the resultant mixture into three parts. |  |  |
| i) To the first portion, add sodium hydroxide solution drop wise until in excess |  |  |
| ii) To the second portion, add dilute ammonia solution drop wise until in excess. |  |  |
| iii) Use the third portion to carry out a test of your choice to confirm the 1st cation in X |  |  |
| e) Transfer the residue from part (c) into a test tube and add few drops of dilute nitric acid. Divide the resultant solution into 4 parts. |  |  |
| i) To the 1st part, add sodium hydroxide solution drop wise until in excess. |  |  |
| ii) To the 2nd part, add ammonia solution drop wise until in excess. |  |  |
| iii) To the 3rd part, 3-4 drops of dilute sulphuric acid. |  |  |
| iv) To the 4th part, add few drops of potassium chromate solution followed by excess sodium hydroxide solution drop wise until in excess. |  |  |

Identify;

(i) Cations in X …………………………………….. and ………………………………

(ii) Anions in X …………………………………… and ………………………………….

1. You are provided with an organic substance Z. You are required to determine the nature of Z. carry out the following tests to identify Z. Record your observations and deductions in the table below.

|  |  |  |
| --- | --- | --- |
| **Tests** | **Observations** | **Deductions** |
| a) Burn a spatula endful of Z on a  porcelain dish. |  |  |
| b) To about 2-3 drops of Z in a  test tube, add 1cm3 of water  and test with litmus. |  |  |
| c) To about 0.5cm3 of Z, add  sodium hydrogen carbonate  solution. |  |  |
| d) To about 0.5cm3 of Z, add 2  drops of iron (III) chloride  solution. |  |  |
| e) To about 1cm3 of Z, add 3 – 4  drops of 2,4 dinitrophenyl  hydrazine solution. |  |  |
| f) To about 1cm3 of Z, add  acidified potassium dichromate  solution and warm. Divide into  2 parts. |  |  |
| i) To the 1st part, add 3-4 drops  of sodium hydrogen sulphite.  ii) To the 2nd part, add 3-4 drops  of 2,4 dinitrophenyl hydrazine  solution. |  |  |
| g) To about 3 drops of Z, add a  reagent of your own choice to  confirm the functional group  in Z. |  |  |

Comment on the nature of Z

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***End-***