Name …………………………………………………..……………………..…………………………………………………..

Index No……. ……………………………..………………..……………………….…..Signature…………..…..……….

**545/3**

**CHEMISTRY**

**Paper 3**

**Jul/Aug 2016**

**2 Hours**

**MUKONO EXAMINATIONS COUNCIL**

**Uganda Certificate of Education**

**CHEMISTRY**

Paper 3

**2 Hours**

**INSTRUCTIONS TO CANDIDATES**

* *Attempt* ***both*** *questions*
* *Answers are to be written in the spaces provided.*
* *Programmable calculators and reference books are* ***NOT*** *allowed.*
* *Mathematical tables, non-programmable silent calculators and slide rules may be used.*
* *All the work to be neatly shown*

|  |  |  |
| --- | --- | --- |
| **FOR EXAMINER’S USE ONLY** | | |
| Q.1 |  |  |
| q.2 |  |  |
| **Total** |  |  |

1. You are provided with the following

**DA1** which is a solution containing 13.0g per litre of impure dibasic acid, **W(COOH)2** (Rfm = 118)

**DA2** which is a solution containing **1.275g** of **hydroxide ion** per litre.

W(COOH)2 Reacts with hydroxide ions in a ratio of 1:2

**You are required to determine the percentage purity of R(COOH)2 in the impure acid.**

**Procedure:**

Pipette 25cm3 (or 20cm3) of DA2 into a conical flask, add 2-3 drops of phenolphthalein indicator and titrate the mixture with DA1 from the burette.

Repeat the titration until you obtain consistent results. Record your results in the table below.

**RESULTS**

Capacity of pipette used…………………………………..cm3 ***(½ mark)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **1** | **2** | **3** |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of BA1 used (cm3) |  |  |  |

***(02 marks)***

Titre values used to calculate average volume of DA1 used …………………………………………..…………………………………………………………… ***(½ marks)***

Average volume of DA1 used ………………………………………………………………………………………………………………………………………………………………………………………………………………………………cm3 ***(1 ½ marks)***

**QUESTIONS**

(a) Calculate:

(i) the molarity of DA2

(O=16, H=1 ) ***(1 ½ marks)***

(ii) the numbers of moles of DA2 that reacted. ***(01 mark)***

(b) Determine

(i) the moles of acid, W(COOH)2 in DA1 that reacted. ***(02 marks)***

(ii) the concentration in moles per litre of acid, W(COOH)2 in DA1 ***(02 mark)***

(iii) the concentration in grams per litre of acid, **W(COOH)2** in DA1 ***(01 mark)***

(iv) the percentage purity of W(COOH)2 in the acid ***(01 mark)***

1. You are provided with substance K which contains two cations and one anion. You are required to identify the cations and anion in K. Carry out the following tests on K and record your observations and deductions in the table below.

Where a gas (es) are evolved, it must be identified. (18 marks)

|  |  |  |
| --- | --- | --- |
| TESTS | OBSERVATION | DEDUCTION |
| (a) Heat two spatula end fuls of K in a dry test tube, first gently then strongly until no further change |  |  |
| (b) To two spatula end fuls of K in a boiling tube, add about 4cm3 of water and shake. |  |  |
| (c) To the resultant solution from (b), add dilute sodium hydroxide solution dropwise until in excess until in excess and warm. |  |  |
| (d) To the solution from (c), add dilute nitric acid solution dropwise until the solution is just acidic.  Divide the acidic solution into 5 parts.  (i) To the first part of the acidic solution, add 3-4 drops of lead (II) nitrate solution and heat |  |  |
| (ii) To the second part of the acidic solution, carry out a test of your own to confirm the anion in K  Test: |  |  |
| (iii) To the third part of the acidic solution, add dilute sodium hydroxide dropwise until in excess |  |  |
| (iv) To the fourth part of the acidic solution, add ammonia solution dropwise until in excess |  |  |
| (v) To the fifth part of the acidic solution add 2-3 drops of potassium iodide solution. |  |  |

(e) Identify

(i) Anion in K…………………………………………….

(ii) Cations in K…………………………………………..

***End -***