**Kenya Certificate of Secondary Education 2019**

**233/3 CHEMISTRY - Paper 3**

 **(Practical)**

 **END TERM 1 2019 Time** 2 hours

**Name …………………………………………….……… Index Number…………………/………**

 **Signature ………………….…...………. Date ……………/…………/……………**

**INSTRUCTIONS TO CANDIDATES**

* Answer all the questions in this paper in the spaces provided.

TRIAL 2

 2019

* You are not allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours

allowed for this paper

* This time is to enable you to read the question paper and make sure you have all the apparatus

and chemicals that you may need

* All working must be clearly shown where necessary
* Mathematical tables/ Electronic calculators may be used.
* **This paper consists of 6 printed pages.Candidates should check the question paper to ensure that pages are printed as indicated and no questions are missing.**

 **FOR EXAMINERS USE ONLY**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum score** | **Candidate’s score** |
| **1** | **22** |  |
| **2** | **08** |  |
| **3** | **10** |  |
| **Total score** | **40****©** **2019** |  |

Turn over

You are provided with:

* **Solution A, containing 4.0gdm-3 of sodium hydroxide**
* **solution B, hydrochloric acid**
* **2.5 g of a mixture of two salts, xcl (RFM 58.5) and CO 3 (RFM 106**)

You are required to:

i ) Standardize solution B, hydrochloric acid.

ii) Determine the mass composition of the salt mixture

**PROCEDURE 1**

1. Fill the burette with solution B
2. Pipette solution A into a clean dry conical flask. Then add 2 -3 drops of phenolphthalein indicator.
3. Titrate solution A solution with solution B. Record your results in the table below.
4. Repeat the procedure two more times to retain concord and values.

**TABLE 1**

|  |  |  |  |
| --- | --- | --- | --- |
| Titration number |  |  |  |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading(cm3) |  |  |  |
| Volume of acid used (cm3) |  |  |  |

* 1. Calculate the average volume of solution B used. (1mk)
	2. Find;
		1. Moles of sodium hydroxide that reacted with the acid (2mks)
		2. Moles of hydrochloric acid present in the average volume (1mk)
		3. Molarity of the acid (1mk)

 **PROCEDURE II**

* + - 1. Put about 100cm3 of water in a 250ml volumetric flask add all the 2.5g of salt mixture. Shake the mixture to dissolve and the solid. Top up the solution to the mark with distilled water Label this solution C
			2. Fill this burette with solution B.
			3. Pipette 25c m3 of solution C and put it into a clean conical flask. Add 3 drops of methyl orange indicator.
			4. Titrate solution C with solution B. Record your results in the table below.
			5. Repeat the titration two more times

 **TABLE II**

|  |  |  |  |
| --- | --- | --- | --- |
| **TITRATION** |  |  |  |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of solution B used (cm3) |  |  |  |

* 1. Calculate the average volume of solution B (1mk)
	2. Calculate the number of moles in the hydrochloric acid used (1mk)
	3. The equation for the reaction of the acid with one of the salts in the mixture is;

**2**

 Calculate;

* + 1. Moles of  that reacted with the acid in the experiment (1mk)
		2. Molarity of  (2mks)
	1. Calculate the mass of the salt mixture in grammes ( 1mk)
	2. Calculate the percentage of xcl in this mixture (2mks)
1. In this experiment, you’re required to determine the time takes for a precipitate to be formed when S3which is sodium thiosulphate solution , reacts with dilute hydrochloric acid.

**PROCEDURE**

1. Using a measuring cylinder measure 50cm3 of S3 into a 100ml beaker.
2. Make a pencil cross on a white piece of paper so that when a beaker is placed top of the paper , the cross can be seen through the bottom of the beaker.
3. To solution A add 10 cm3 of 2M hydrochloric acid and at the same time start a stop watch / stop clock. Swirl the contents of the beaker twice and then place it over the cross on the paper . Look at the cross from above the beaker through the mixture. Stop the stop watch immediately the precipitate makes the cross invisible . Record time taken for the cross to become invisible in the table below, rinse beaker .
4. Repeat the procedure with solutions B,C,D and E.as per the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SOLUTION** | **Volume of solution S3 in the beaker (cm3)** | **Volume of water added (cm3)** | **Volume of 2M HCL** | **Time taken in seconds** |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| D |  |  |  |  |
| E |  |  |  |  |

* 1. Plot the graph of volume of solution S3 (Y – axis )against time (4mks)



1. a) From the graph state the relationship between concentration of solution S3 and time.

 (1mk)

………………………………………………………………………………………………………….

 b) Why is water added to the S3 (1mk)

…………………………………………………………………………………………………………….

…………………………………………………………………………………………………………….

1. You’re provided with solid D. Carry out the tests shown below on the solid.
	* 1. Heat a spatula full of D in A clean dry test – tube.

 **Observation Inference**

 (1 mk) (½ mks)

* 1. Put a spatula end- full of D in a boiling tube. Half fill it with water. shake this mixture.

 **Observation Inference**

 (½ mks)

 (½ mks)

* + - 1. Divide the resultant mixture in (b)above into 5 portions
				1. To the first portion add dilute nitric acid followed by a few drops of Barium nitrate

 **Observation Inference**

 (1mk) (1mk)

To the second portion, add nitric acid a few drops followed by lead (ii) nitrate and then warm the mixture.

**Observation Inference**

 (1mk) (½ mk)

To the third portion, add sodium hydroxide solution drop wise until in excess. Warm this mixture. Test any gas produced withy Litmus paper

 **Observation Inference**

 (½ mk) (½ mk)

You are provided with liquid B . Carry out the tests shown below and write your observations and inferences in the spaces provided:

To about 1cm3 of liquid B in a test – tube , add about 1cm3 of distilled water and shake the mixture.

 **Observation Inference**

 (½ mk) (½ mk)

1. To about 1cm3 of liquid B in a test tube add a small amount of solid sodium hydrogen carbonate

 **Observation Inference**

 (½ mk ) (½ mk)

 iii. To about 2cm3 of liquid B in A test – tube, add about 1cm3 of acidified potassium dichromate (vi) . Warm the mixture gently and allow it to stand for about one minute.

 **Observation Inference**

 (1mk) (1mk)

THS IS THE LAST PRINTED PAGE