**Name: ……………………………………..………Adm No………………Class…….................**

**233/3**

**CHEMISTRY**

**PAPER 3**

**(PRACTICAL)**

**APRIL-2023**

**TIME: 2 ¼ HOURS**

**CHOGORIA/MURUGI JOINT EVALUATION EXAMINATION - 2023**

***Kenya Certificate of Secondary Education (K.C.S.E.)***

**Chemistry**

**Paper 3**

**(Practical)**

**Time: 2 ¼ Hours**

**INSTRUCTIONS TO CANDIDATES**

* *Write your* ***name****, admission number and class.*
* *Answer* ***all*** *the* ***Q****uestions in the spaces provided.*
* *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* ***Q****uestion paper and make sure you have all the chemicals and apparatus you need.*
* *All working* ***must*** *be clearly shown where necessary.*
* *Mathematical tables and electronic calculators may be used.*
* ***This paper consists of 6 printed pages.***
* ***Candidates should check to ascertain that all pages are printed as indicated and that no Questions are missing.***

**FOR EXAMINER’S USE ONLY**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s Score** |
| **1** | **19** |  |
| **2** | **12** |  |
| **3** | **09** |  |
| **TOTAL** | **40** |  |

**Question 1**

You are provided with the following:

* Solution **A** ; Hydrochloric acid
* Solution **B**; 0.03M sodium hydroxide
* Solution **C**, Containing 15.74g of Na2CO3. **X**H2O in 250ml of the solution.

You are required to determine: -

1. The concentration of solution **A**
2. The value of **X** in the carbonate Na2CO3. **X**H2O

**PROCEDURE A**

* Fill the burette with solution **A**. Using clean pipette, place 25.0cm3 of solution **B** into a 250ml conical flask.
* Add 2 drops of **phenolphthalein indicator** and titrate with solution **A**. Record your results in **table I** below. Repeat the experiment two more times and complete the table.

**Table I** (4mks)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **III** |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of solution **A** (cm3) used |  |  |  |

 a) Determine the :-

1. Average volume of solution A used. (1mk)

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1. Number of moles of sodium hydroxide in 25 cm3 of solution **B** used. (1mk)

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1. Number of moles of acid in volume of solution **A** used. (1mk)

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1. Concentration of solution **A** in moles per litre. (1mk)

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**PROCEDURE B**

* Using a **clean** pipette, place 25.0 cm3 of solution **C** into a 250ml volumetric flask. Add about 100cm3 of distilled water. Shake well and add more distilled water to make up to the mark. Label this solution **D**
* Fill the burette with solution **A**. Using a **clean** pipette, place 25 cm3 of solution **D** into a conical flask. Add 2 drops of **methyl orange indicator** and titrate with solution **A**. Record your results in the **table II.**
* Repeat the titration two more times and complete **table II**.

**Table II**  (4mks)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **III** |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of solution **A** (cm3) used |  |  |  |

 b) Determine the: -

1. Average volume of solution **A** used. (1mk)

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1. Moles of the acid of solution **A** that reacted with the carbonate solution **D**. (1mk)

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1. Number of moles of the carbonate in 25 cm3 of solution **D** used. (1mk)

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1. Number of moles of carbonate in 250cm3 of solution **D** (1mk)

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1. Concentration of carbonate solution **C** in **moles per litre**. (1mk)

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1. Concentration of the carbonate solution **C** in **grams per litre**. (1mk)

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1. Value of **X** in Na2CO3. **X**H2O (H=1.0, C=12.0, O=16.0 Na=23.0) (1mk)

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**Question 2**

You are provided with solid **M**. Use it to carry out the tests below. Write the observations and inferences in the space provided.

1. Place solid **M** in a boiling tube and add about 10cm3 of distilled water. Divide the resulting solution into **five portions**

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the first portion add sodium hydroxide solution dropwise till excess.

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the second portion add aqueous ammonia solution dropwise till excess.

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the third portion add 3 drops of sodium chloride solution.

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the fourth portion add about 2cm3 of HNO3 acid.

|  |  |
| --- | --- |
| **Observation**  | **Inference** |
|  **(1mk)** |  **(1mk)** |

1. To the fifth portion add 3 drops of lead (II) nitrate solution and warm.

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

**Question 3**

You are provided with solid **G**. Use it to carry out the tests below. Write the observations and inferences in the space provided.

1. Using a **clean** metallic spatula, take one third of solid **G** and place on Bunsen burner flame.

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. Place the remaining solid **G** in a boiling tube. Add 10cm3 of distilled water and shake the mixture until all the solid dissolves. Divide the resulting solution into **four portions**.

To the first portion add 3 drops of acidified potassium manganate (vii)

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the second portion add 3drops of bromine water

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the fourth portion dip universal indicator paper and determine the **pH** of the solution

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(1mk)** |  **(1mk)** |

1. To the third portion add solid sodium hydrogen carbonate

|  |  |
| --- | --- |
| **Observation**  | **Inference**  |
|  **(½mk)** |  **(½mk)** |