**NAME……………………………………………………………….. ADM. NO…………………………..CLASS.…………..**

**233/3 Candidate’s Signature ………..…………………**

**CHEMISTRY**

**Paper 3 Index Number ……………………………………**

**PRACTICAL**

**SEPTEMBER 2021**

**Time: 21/4 hours**

**WISDOM PRE-MOCK EXAMINATIONS 2021**

**Kenya Certificate of Secondary Education**

**233/3**

**CHEMISTRY**

**Paper 3**

**PRACTICAL**

**Time: 21/4 hours**

**Instructions to Candidates**

1. *Write your name and ADMISSION numbers in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *Answer* ***ALL*** *the questions in the spaces provided in the question paper.*
4. *Mathematical tables and silent electronic calculators may be used.*
5. *All working* ***MUST*** *be clearly shown where necessary.*
6. *Candidates should check the question paper 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** | **20** |  |
| **2** | **10** |  |
| **3** | **10** |  |
| **TOTAL SCORE** | **40** |  |

*This paper consists of 7 printed pages.*

1. **(20 marks)** You are provided with:

* Solution **P**, hydrochloric acid
* Solution **Q,** containing 8.8g per litre of sodium hydroxide.
* 0.6g of an impure carbonate, solid **B**

You are required to determine the:

1. Concentration of solution **P** in moles per litre.
2. Percentage purity of the carbonate, solid **B**.

**Procedure I**

Fill the burette with sodium hydroxide, solution **Q**. Pipette 25.0cm3 of hydrochloric acid, solution **P** into a conical flask. Add 2 – 3 drops of methyl orange indicator and titrate. (The colour of the indicator changes from pink to yellow). Record your results in table 1 below. Repeat the titration two more times and complete the table.

**Table I**

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

(4 marks)

1. What is the average volume of solution **Q** used? (1 mark)
2. Determine the:
3. Concentration of solution **Q** in moles per litre. (Na = 23.0; O = 16.0, H = 1.0) (1 mark)
4. Concentration of solution **P** in mole per litre (2 marks)

**Procedure II**

Using a 100ml measuring cylinder, measure out 100cm3 of solution **P** into a 250cm3 beaker.

Add all of solid **B** into the beaker containing solution **P**. Swirl the mixture and allow the reaction to proceed for about 4 minutes.

Label the solution obtained here as solution **K**.

Fill the burette with sodium hydroxide, solution **Q**. Pipette 25.0cm3 of solution **K** into a conical flask. Add 2- 3 drops of methyl orange indicator and titrate. Record your results in table II below. Repeat the titration two more times and complete the table.

**Table II**

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

(4 marks)

1. What is the average volume of solution **Q** used? (1 mark)
2. Calculate the :
3. Moles of hydrochloric acid in 25.0cm3 of solution **K**. (1 mark)
4. Moles of hydrochloric acid in 100cm3 of solution **K**. (1 mark)
5. Moles of hydrochloric acid in 100cm3 of the original hydrochloric acid solution **P**. (1 mark)
6. Moles of hydrochloric acid that were used up in the reaction with solid **B**. (1 mark)
7. Moles of the carbonate that reacted with hydrochloric acid. (1 mark)
8. Given that the relative formula mass of the carbonate is 72, calculate the:
9. Mass of the carbonate that reacted. (1 mark)
10. Percentage purity of the carbonate, solid **B**. (1 mark)
11. **(10marks)** You are provided with solid **M**. Carry out the tests below and record your observations and inferences in the spaces provided.
12. Place **all** of solid **M** in a boiling tube and add about 10cm3 distilled water and shake.

**Observations Inferences**

(½mark) (½ mark)

1. Divide the solution into five portions of about 2cm3 each.
2. To the first portion, add aqueous sodium hydroxide dropwise until in excess.

**Observations Inferences**

(1mark) (1mark)

1. To the second portion, add aqueous ammonia dropwise until in excess.

**Observations Inferences**

(1mark) (1mark)

1. Dip a glass rod in the third portion and heat it on a burnsen burner flame, identify the colour of the flame produced.

**Observations Inferences**

(½mark) (½mark)

1. To the fouth portion,add about 1cm3 of lead (II) nitrate solution.

**Observations Inferences**

(1mark) (1mark)

1. To the fifth portion, add about 1cm3 of dilute sodium hydroxide followed by a small piece of aluminium foil. Warm the mixture gently and carefully. Test any gas produced using blue and red litmus papers.

**Observations Inferences**

(1mark) (1mark)

1. **(10marks)**You are provided with solid **W**. Carry out the tests below and record your observations and inferences in the spaces provided.
2. Place about one third of solid **W** on a **metallic** spatula and burn it using a Bunsen burner.

**Observations Inferences**

(1mark) (1mark)

1. Place the remaining solid **W** into a boiling tube. Add 10cm3 of distilled water and shake well. Use 2cm3 portions of the mixture for each of the following reactions.
2. To the first portion, add 2 drops of acidified potassium manganate (VII) and shake well.

**Observations Inferences**

(1mark) (1mark)

1. To the second portion, add three drops of bromine water

**Observations Inferences**

(1mark) (1mark)

1. To the third portion put universal indicator paper.

**Observations Inferences**

(1mark) (1mark)

1. To the fourth portion add a little solid **Y**, sodium hydrogen carbonate.

**Observations Inferences**

(½mark) (½mark)

1. To the fifth portion add about 2cm3 of ethanol and warm the mixture.

**Observations Inferences**

(½mark) (½mark)