**Name: ………………………………………………… No. …………………………………**

**School: ……………………………………………….. Candidate’s Sign. ……….………..**

 **Date: …………….…………………**

233/3

**CHEMISTRY**

Paper 3

**Time: 2 ¼ Hours**

**NZAUI SUB COUNTY FORM 4 ENTRANCE EXAM 2015**

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

**Chemistry 3**

Practical

**Time: 2 ¼ Hours**

**INSTRUCTIONS TO THE CANDIDATES:-**

* ***Write your name*** *and* ***index number in the spaces provided in the question paper.***
* ***Sign*** *and write the* ***date*** *of examination in the spaces provided above.*
* *Answer* ***all*** *the questions in the spaces provided in the question paper****.***
* *You are not allowed to start working with 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 the chemicals and apparatus that you may need.*
* *Mathematical tables and silent electronic calculators* ***may be*** *used.*
* *All working* ***MUST*** *be clearly shown where necessary.*
* *This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing*

**For Examiners use Only**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **MAX. SCORE** | **CANDIDATE’S SCORE** |
| 1 | 26 |  |
| 2 | 8 |  |
| 3 | 6 |  |
| **TOTAL SCORE** | **40** |  |

1. You are provided with
* Hydrochloric acid solution A
* 0.25M Sodium hydroxide solution B
* 0.53g X2CO3 solid R

 You are required to:

1. Standardize A using solution B
2. Use the standardized solution A to determine the R.A.M of X in solid R.

 PROCEDURE 1

 Fill the burette with solution B

 Pipette 25.0cm3 of solution A into conical flask

 Add a few drops of phenolpthalain indicator. Titrate solution A with solution B until a pink colour just appears.

 Repeat the procedure to obtain consistent results.

 Record your results in the table below

 Table 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 | 2 | 3 |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading(cm3) |  |  |  |
| Volume of solution B used (cm3) |  |  |  |

1. Determine the average volume of A used. (1 mark)

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

1. Calculate the number of moles of NaOH(aq) used in a (i) above. (1 mark)

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

1. Calculate the number of moles of hydrochloric acid in 25cm3 of solution A. (1 mark)

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

1. Determine the Molarity of hydrochloric acid in moles per litre. (2 marks)

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

1. Determine the number of moles of hydrochloric acid in 100cm3 of solution A (2 marks)

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 PROCEDURE II

 Using a measuring cylinder measure exactly 100cm3 of solution A into a clean beaker. Put all the solid R into this solution. Shake the mixture until all the solid has dissolved and no more effervescence occurs. Label this solution C. Fill the burette with solution B.

 Pipette accurately 25cm3 of solution C into a clean conical flask and add few drops of phenolphthalein indicator.

 Titrate solution C with solution B until a permanent colour change occurs.

 Repeat until you obtain consistent results.

 Record your readings in the table below.

 TABLE II

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 | 2 | 3 |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading(cm3) |  |  |  |
| Volume of solution B used (cm3) |  |  |  |

 (4 marks)

1. Determine the average volume of solution B used. (1 mark)

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

1. Calculate the number of moles of sodium hydroxide in average volume used. (1 mark)

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

1. Determine the number of moles of hydrochloric acid in 25cm3 solution C. (1 mark)

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

1. Calculate the number of moles of hydrochloric acid in 100cm3 of solution C. (1 mark)

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

1. How many moles of hydrochloric acid reacted with the solid R. (2 marks)

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

1. Calculate the number of moles of solid R which reacted with hydrochloric acid. (2 marks)

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

1. Determine the relative molecular mass of solid R. (2 marks)

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

1. What is the relative Atomic mass of metal X in solid R (C=12,0=16) (1 mark)

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

1. Place all solid E in a clean boiling tube. Add about 10cm3 of distilled water. Shake well until the solid dissolves. Use about 2cm3 portions for each of the tests below.
2. To one portion add aqueous sodium hydroxide dropwise until in excess.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

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

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

1. To a third portion add 0.5M barium nitrate solution.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

1. To the forth portion add drops of Barium nitrate solution followed by a few drops of dilute nitric (v) acid.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

1. You are provided with solid G. You are required to carry out the tests and record your observations.

 Place a spatula full of solid G into a boiling tube. Add about 6 cm3 of distilled water and shake well. Divide the mixture into four portions in test tubes.

1. To the first portion Add three drops of potassium manganate VII solution.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

1. To the second portion add a few drops of bromine water.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |

1. To the third portion, add one spatula full of Sodium Carbonate.

|  |  |
| --- | --- |
| Observation | inferences |
| (1 mark) | (1 mark) |