**Name………………………………………………… Index No. …………………….**

**School ………………………………………………...**

233/3

**CHEMISTRY**

**PRACTICALS**

Paper 3

July/August- 2019

**Time: 2 ¼ Hours**

**MALIET SCHOOLS EVALUATION EXAMINATIONS – 2019**

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

233/3

**CHEMISTRY**

**PRACTICALS**

Paper 1

March/April- 2019

**Time: 2 ¼ Hours**

## INSTRUCTIONS TO CANDIDATES.

* Answer **all** the questions 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 in this paper. This is to enable you read the question paper and make sure you have all the chemicals and apparatus you may need.
* Mathematical tables and Electronic calculators may be used.
* All working **must** be clearly shown where necessary

*For Examiner’s Use only*

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidates Score** |
| **1** | **15** |  |
| **2** | **15** |  |
| **3** | **10** |  |
| **Total** | **40** |  |

*This paper consists of 4 printed pages.*

*Candidates should check the question paper to ensure that all pages are printed as indicated*

*and no questions are missing*

1. You are provided with the following solutions

* M1 containing 95g of a mixture of sodium carbonate and sodium chloride per litre of solution.
* M2 which is 1MHCl.

You are to determine the percentage of sodium chloride in the mixture.

Proceed as follows

Pipette 25.0cm3 of M1 and titrate with M2 from the burette using 3 – 4 drops of methyl orange indicator. Stop titrating when a permanent pink colour appears. Repeat the experiment and complete the table below.

**TABLE 1**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **III** |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of M2 used (cm3) |  |  |  |

4mks

1. Determine the average volume of M2 used. Show your workings.1mk

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b) Determine the number of moles of M2 used 2mks

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c) Write down an ionic equation for the substances that react. 1mk

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d) Determine the number of moles of the base used. 2mks

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e) Calculate the concentration of sodium carbonate. 2mks

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1. Determine the mass of sodium carbonate in 1 litre of the solution (Na=23, C=12, O=16)

(2mks)

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g) Determine the percentage of sodium chloride in the mixture. 2mks

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2. You are provided with the following solutions

* 1M HCl, solution M2
* 1 M NaOH, solution M3

You are expected to determine the molar heat of neutralization of hydrochloric acid.

Proceed as follows:

Measure 23cm3 of M2 and put in a 100ml beaker. Measure its temperature and record in the table below under first column. By use of measuring cylinder measure 5cm3 of M3 and add to M2 in the beaker. Stir with the thermometer and record the final steady temperature. Continue adding 5cm3 at a time and recording the temperature till 35cm3 of M2 has been added, complete the table below.

1. TABLE II

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Volume of M3 added (cm 3) | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| Temperature (C0) |  |  |  |  |  |  |  |  |

4mks

b) Plot a graph of temperature (vertical axis) against volume of NaOH added. 4mks



c) From your graph determine

(i) Volume of 1M NaOH needed to neutralize 23cm3 of 1M HCl 1mk

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(ii) Rise in temperature ΔT. 1mk

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d) Calculate the amount of heat evolved in the above reaction. Take specific heat capacity of solution to be 4.2J/gK, density of solution 1glcm3. 2mks

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e) Calculate the number of moles of HCl used. 1mk

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f) Hence determine the molar heat of neutralization of hydrochloric acid. 2mks

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1. Take a spatula endful of W and put in a boiling tube. Add about 8cm3 of water and shake. Keep the mixture for the tests below.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| 1mk | 1mk |

b) To about 2cm3 of solution of W add Sodium Hydroxide (2M NaOH) dropwise till in excess.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| 1mk | 2mks |

c)To about 2cm3 of solution W, add Ammonia solution (2M NH3(aq)) dropwise till in excess.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| 1mk | 2mks |

d) Add about 2cm3 of solution W, add about 5 drops of Nitric Acid (HNO3(aq)) followed by 2 drops of Barium chloride.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| 1mk | 1mk |