NAME……………………………………………………………INDEX NO:…………………..

SCHOOL: ……………………………………………………….DATE……………… ………

233/3

CHEMISTRY

PRACTICAL

PAPER 3

**JULY/AUGUST, 2018**

**TIME: 2¼ HOURS**

**NAKURU SUB COUNTY TRIAL EXAMINATIONS 2018**

**CHEMISTRY PAPER 3**

**INSTRUCTIONS TO CANDIDATES**

* Write your name and index number 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 the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time it to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
* All working MUST be clearly shown where necessary
* Mathematical tables and electronic calculators may be used.

FOR EXAMINER’S USE ONLY

|  |  |  |
| --- | --- | --- |
| QUESTION | MAX. SCORE | SCORE |
| 1 | 21 |  |
| 2 | 13 |  |
| 3 | 6 |  |
| TOTAL SCORE | 40 |  |

**You are provided with**

* Solution **A**, hydrochloric acid.
* Solution **B**,0.5 M sodium hydroxide
* 8 cm magnesium ribbon

**You are required to ;-**

* Determine the heat of reactionbetween hydrochloric acid and magnesium
* Mass of magnesium per cm
* The molarity of hydrochloric acid solution **A**

**Procedure 1**

1. Using a 100cm3 measuring cylinder, measure out carefully 50cm3of hydrochloric acid and transfer into the 100ml plastic beaker
2. Place the cleaned magnesium ribbon next to a ruler making sure the magnesium ribbon is flat. Cut the magnesium ribbon into 4 pieces of 2cm each
3. Place a thermometer into the acid and record the temperature in your table
4. Add one 2 cm piece of magnesium ribbon to the acid making sure that it does not stick to the side of the beaker by stirring with the thermometer.
5. Monitor the temperature of the solution very carefully and record the highest temperature reached, record this in your table **1**
6. Repeat the above procedure with another 2 cm length of magnesium ribbon each time and complete table 1 below.**(Retainthe solution for procedure II**)

**Table 1**

|  |  |
| --- | --- |
| **Length of magnesium cm** | **Temperature( 0C)** |
| 0 |  |
| 2 |  |
| 4 |  |
| 6 |  |
| 8 |  |

(**4marks)**

Draw a graph of length of magnesium ribbon (vertical axis) against temperature (3marks)



1. From the graph determine the highest temperature change (1mark)

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

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

b) Calculate

1. the heat change for the reaction (assume the specific heat capacity of the solution is 4.2Jg-1K-1 and the density of solution is 1.0gcm-3(1mark)

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ii) Moles of magnesium, given that the enthalpy change of this reaction is -323kJ molˉ¹. (1mark)…………………………………………………………………………………………………………….

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1. Mass of magnesium used in the reaction(Mg=24) (1mark)

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1. Mass of magnesium per cm (1mark)

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**Procedure II**

Transfer the contents obtained in **procedureI**into a 250 ml volumetric flask.Rinse the beaker with distilled water and pour the contents into conical flask and add distilled water to make up to the mark. Label this as solution **C**. Using a pipette and a pipette filler, transfer 25cm3 of thissolution into a conical flask add 2-3 drops of phenolphthalein indicator .Fill the burette with solution**B** and titrate with solution C .Record your results in **table 2** below. Repeat the titration two more timesto complete the table.

**Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| 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)

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**Calculate**

1. Moles of solution **B** in the average titre( 1mark)

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1. Moles of acid in the acid solution **C**in 25 cm3 (1mark)

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1. Moles of acid solution **A** in 50 cm3 of solution (1mark)

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 vi) Molarity of solution **A**.(1mk)

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2 You are provided with solid **D**. perform the following test and write the observations and inferences.

1. Place solid **D** into a boiling tube and add 10cm3 of distilled water. Shake the boiling tube and filter. Keep the residue for test (b). Divide the filtrate into four portions.

(i)To the first portion, add sodium hydroxide dropwise until in excess.

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

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

(ii) To the second portion, add ammonia solution dropwise until in excess

(iii)To the third portion, add a few drops of Lead(II) nitrate solution

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

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

(iv)To the fourth portion, add 5 cm32 M sodium hydroxide solution, followed by the aluminium foil.

Heat the mixture and test for any gases with red litmus paper

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

1. Place the residue into a test tube and add 10cm3 of dilute nitric (v) acid and shake until the solid dissolves.

(i) To the first portion, add sodium hydroxide dropwise until in excess

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

 (ii) To the second portion, add ammonia solution dropwise until in excess

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

 (iii) To the third portion, add a few drops of sodium sulphate solution

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

3. You are provided with solid **L.** Carry out the tests below and record your observations and inferences in the spaces provided.

(i) Place the solid in a test-tube. Add about 6cm3 of distilled water and

shake the mixture well. Divide the solution into 3 portions.

Observation Inference

 (½mk) (½mk)

(ii) To about 2cm3 of the solution, add all the solid **K,** sodium hydrogen carbonate.

Observation Inference

(1mk) (1mk)

(iii) To about 1cm3, add 3 drops of acidified potassium dichromate (VI) and warm.

Observation Inferences

(1mk) (1mk)

(iv) In another 2cm3, add 2 drops of acidified potassium manganate (vii)

Observation Inferences

(½mk) (½mk)