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

**School ............................................................................................Candidate's signature .............................**

**233/3**

**CHEMISTRY**

**PAPER 3**

**PRACTICAL**

**DECEMBER, 2020**

**TIME: 2¼ HOURS**

**Date .....................................................**

**LANJET CLUSTER JOINT MOCK EXAMINATION - 2020**

***Kenya Certificate of Secondary Education***

 **CHEMISTRY**

Paper - 233/3

**Time:** 2¼ hours

**INSTRUCTIONS TO CANDIDATES**

• Write your name and index number in the spaces provided.

• Sign and write the date of examination in the spaces provided on the question paper.

• 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 2¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus you need.

• Mathematical tables and silent electronic calculators' may be used.

• All working must be clearly shown where necessary.

**FOR EXAMINER'S USE ONLY**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum marks** | **Candidate's score** |
| **1** | 20 |  |
| **2** | 11 |  |
| **3** | 9 |  |
| **Total score** | 40 |  |

***This paper consists of 8 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no pages are missing.***

1. You are provided with;
* Solid A magnesium ribbon
* Solution B 2MHCL
* Solution C, 0.3MNaOH
* Distilled water

You are required to determine the:

1. Temperature change when magnesium reacts with excess hydrochloric acid
2. Number of moles of hydrochloric acid that remains unreacted
3. Number of moles of magnesium that reacted
4. Molar heat of reaction between magnesium and hydrochloric acid

**Procedure 1**

Using a burette, measure 50cm of solution B and place it in 100ml beaker. Measure the temperature of solution B in 100ml beaker after every 10 seconds. At 30th seconds add magnesium ribbon to solution B and continue recording the temperature. Stir the mixture continuous with a thermometer making sure that the magnesium ribbon remains in the solution as it reacts. Measure the temperature after ever 10 seconds and record values at the table below. Continue stirring and measure the temperature to complete table 1 below.

Keep the resulting solution for use in procedure 2.

**Table 1**

a)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time (sec)** | **0** | **10** | **20** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **100** | **110** | **120** | **130** |
| **Temperature (0C)** |  |  |  |  **X** |  |  |  |  |  |  |  |  |  |  |

i) Plot graph of temperature against time on the grid provided. (3mks)

ii) On the graph, show the maximum change in temperature $∆T $ and deter mine its value.

**Procedure 2**

Transfer all the solution obtained in procedure 1 into 250ml volumetric flask. Top up with distilled water to 250ml mark. Label it with solution D. Empty the burette and fill it with solution C. Pipette 25mlof solution D and place it in 250ml conical flask. Add drops of phenolphthelene indicator and titrate solution C against solution D. Record the results in table 2. Repeat the titration of solution C against solution D and complete table 2.

**Table 2**

 b)

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| Find burette reading |  |  |  |
| Initial burette reading |  |  |  |
| Volume of solution C (cm3) |  |  |  |

 (4mks)

i) Calculate average volume of solution C used. (1mk)

ii) Calculate the number of moles of:

I 0.3MNaOH (1mk)

II Hydrochloric acid in 25cm3 of solution D. (1mk)

III Hydrochloric acid in 250cm3 of solution D. (1mk)

IV Hydrochloric acid in 50cm3 of solution B. (1mk)

V Hydrochloric acid that reacted with magnesium. (1mk)

VI Magnesium that reacted. (1mk)

c).Using your answer in iv above, determine molar heat of reaction between magnesium and hydrochloric acid. Assume the heat capacity of solution is 4.2Jg-1k-1 and density of solution 1g/cm3. (2mks)

1. You are provided with solid E. Carry out the experiments below. Write your observation and inferences in the space provided.

a) Place all solid E in a boiling tube. Add about 20cm3 distilled water and shake until all the solid dissolves label this solution E. use solution E for experiments (i) and (ii)

i) To 2cm3of solution E in a test tube in each of experiments I,II,III and IV add:

 I Two drops of aqueous sodium sulphate;

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

 II Five drops of aqueous sodium chloride;

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

III Two drops of barium Nitrate;

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

IV Two drops of lead (ii) Nitrate

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

ii) To 2cm3 of solution E in a test tube add 5 drops of aques sodium hydroxide. Add a piece of Aluminium foil provided to the mixture and shake. Warm the mixture and test any gas produced with the and read litmas papers.

|  |  |
| --- | --- |
| Observations | Inferences |
|   (2mk) |  (1mk) |
|  |  |

1. You are provided with solid F. Carry out the following tests and record the observations and inference in the space provided.

a) Place about one third of the solid F on a clean metallic spatula and burn it in a Bunsen burner flame.

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

b) Place the remaining amount of solid F in a boiling tube. Add about 10cm3of distilled water and shake use the mixture for tests (i) to (ii)

|  |  |
| --- | --- |
| Observations | Inferences |
|   (½mk) |  (½mk) |

i) Using about 2cm3 of the mixture in a test tube determine the PH Using universal indicator paper and chart.

|  |  |
| --- | --- |
| PH | Inferences |
|   (1mk) |  (1mk) |

ii) To about 2cm3of the mixture in a test tube add three drops of acidified potassium manganese vii.

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |

iii) To about 2cm3 of the mixture in a test tube add two or three drops of bromine water.

|  |  |
| --- | --- |
| Observations | Inferences |
|   (1mk) |  (1mk) |