**FORM THREE**

**CHEMISTRY - 233/3**

**PAPER 3**

**PRACTICAL**

**TERM 2**

**TIME: 2¼ HOURS**

**NAME:.......................................................................... ADM.NO..................**

INSTRUCTIONS

(a) Write your name and admission number.

(b) Answer all the questions in the spaces provided

(c) Spend the first 15 minutes of the 2¼ hours to read the question paper and ensure you have all the chemicals and apparatus that you may need.

(d) All working must be clearly shown where necessary.

(e) Mathematical tables and silent calculators may be used.

(f) Answer all the questions in English.

For Examiners use only.

|  |  |  |
| --- | --- | --- |
| Questions | Maximum score | Candidates score |
| 1 | 20 |  |
| 2 | 20 |  |
| Total |  |  |

Q1 You are provided with

* Metal carbonate M2CO3 solid Q which weighs exactly 5.0g
* 2M hydrochloric acid solution P
* Sodium hydroxide solution R made by dissolving 40g of the solid in a litre of solution.

You are required to determine

* The relative formula mass (RFM) of M2CO3 and hence the relative atomic mass (RAM) of M.

Procedure

* Measure accurately using a measuring cylinder 100cm3 of solution P into a clean 250cm3 conical flask.
* Add all the 5.0g of solid Q,shake well and wait for effervescence to stop.
* Put the solution into a 250ml clean beaker.
* Label the resulting solution S.
* Pipette 25cm3 of solution R into a clean conical flask and add 2-3 drops of phenolphthalein indicator
* Fill the burette with solution S and titrate against solution R.
* Record the results in the table below
* Repeat the titration two more times and record in the table. (4mks)

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 | 11 | 111 |
| Final burette reading |  |  |  |
| Initial burette reading |  |  |  |
| Volume of S used(cm3) |  |  |  |

(a) Calculate the average volume of solution S used (1mk)

(b) Calculate

(i) Moles of sodium hydroxide solution R used (2mks)

ii) Moles of hydrochloric acid solution S in the average volume used (2mks)

(iii) Moles of HCl solution S in 100cm the of solution. (2mks)

(iv) moles of hydrochloric acid solution P in the 100cm2 of the original solution (2mks)

(v) Moles of HCl solution P that reacted with solid Q (2mks)

(vi) Moles of M2CO3 solid Q that reacted (2mks)

(vii) The RFM of M2CO3 (2mks)

(viii) The RAM of metal M (1mk)

(Na=23 O=16, H=1)

Q2 Carry out the tests on the substances given and record your observations and inferences in the spaces provided.

(a)(i) Put half of solid A in a boiling tube, add about 3cm3 of distilled water shake and retain the solution

Observation Inference

½mk ½mk

(ii) To the solution above, add a few drops of ammonia solution then add in excess

Observation Inference

1mk 1mk

(III) Scoop the rest of solid A in a clean metallic spatula and burn on a non-luminous flame.

Observation Inference

½ mk ½mk

(b)(i) Put ½ of solid B in a test tube and add about 1cm3 of distilled water

Observation Inference

½mk ½mk

(ii) Put the remaining solid in a test tube and add about 1cm3 of dilute hydrochloric acid.

Observation Inference

½mk ½mk

(c) (i) Put ½ of solid C in a test tube,heat gently then strongly observing the colour changes in the solid when heating and after cooling. Test any gas produced with wet litmus papers and a glowing splint.

Observation Inference

3mk 1½mk

(ii) Put the remaining solid C in a test tube and add about 2cm3 of distilled water,shake well. Add ammonia solution drop wise then in excess

Observation Inference

1mk 1mk

(d) Put solid D in a test tube and add 2cm3 of distilled water. Shake well then add ammonia solution drop wise then in excess.

Observation Inference

1mk 1mk

(e) Repeat procedure in (d) above with solid E.

Observation Inference

1mk 1mk

(f) Divide solution F into 3 portions.

(i) Test the PH of the first portion with universal indicator.

Observation Inference

½mk ½mk

(ii) in the second portion drop a piece of magnesium ribbon and test for any gas produced with a burning splint.

Observation Inference

1mk ½mk

(III) To the third portion add a ¼ spatula of sodium hydrogen carbonate.

Observation Inference

½mk ½mk