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 M_2CO_3 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 M_2CO_3 and hence the relative atomic mass (RAM) of M.

Procedure

- Measure accurately using a measuring cylinder $100cm^3$ of solution P into a clean $250cm^3$ 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 $25cm^3$ 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(cm^3)			

(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 $100cm^2$ of the original solution (2mks)

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

(vi)   Moles of M_2CO_3 solid Q that reacted   (2mks)

(vii)   The RFM of M_2CO_3 (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 3cm^3 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 1cm^3 of distilled water

Observation	Inference

(ii) Put the remaining solid in a test tube and add about 1cm^3 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 2cm^3 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 2cm^3 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