

## Chemistry III

# 015

08 Nov. 2013 08.30am - 11.30am

REPUBLIC OF RWANDA



RWANDA EDUCATION BOARD

LYCEE DE KIGALI  
BIBLIOTHEQUE

### ADVANCED LEVEL NATIONAL EXAMINATIONS 2013

**SUBJECT: CHEMISTRY**

**PAPER III: CHEMISTRY PRACTICAL**

**COMBINATIONS:- BIOLOGY-CHEMISTRY-GEOGRAPHY (BCG)**

**- MATHEMATICS-CHEMISTRY-BIOLOGY (MCB)**

**- PHYSICS-CHEMISTRY-BIOLOGY (PCB)**

**- PHYSICS-CHEMISTRY-MATHEMATICS (PCM)**

**DURATION: 1 Hour 30 Minutes**

#### **INSTRUCTIONS TO CANDIDATES:**

1. Don't open this question paper until you are told so.
2. This paper consists of **one** question which is **compulsory. (25 marks)**
3. **All** answers should be written in the spaces provided on this question paper.
4. ***Please read carefully before you start and make sure that you have all the apparatus and chemicals that you may need.***
5. **Periodic Table is not allowed.**
6. Non-programmable scientific calculators may be used.

**YOU ARE PROVIDED WITH THE FOLLOWING:**

- **BA** which is a solution of  $MCO_3$  prepared by dissolving 0.5g of  $MCO_3$  in 25  $cm^3$  of 1 M hydrochloric acid solution. (M is a divalent metal).
- 1M sodium hydroxide (NaOH) solution.

(Atomic mass: H=1, C= 12, O= 16, Na=23, Cl= 35.5,)

**PROCEDURE**

1. Pipette 25  $cm^3$  of **BA** into a conical flask and add 2 drops of phenolphthalein indicator.
2. Titrate the resultant solution by 1M sodium hydroxide from a burette.
3. Record your results in the table below : **(3 marks)**

Volume of the pipette used: .....

Final burette readings ( $cm^3$ )			
Initial burette readings ( $cm^3$ )			
Volume of 1M NaOH ( $cm^3$ )			

The average volume of 1M NaOH used = **(2 marks)**

(a) The total number of moles of HCl used to prepare **BA** solution = **(2 marks)**

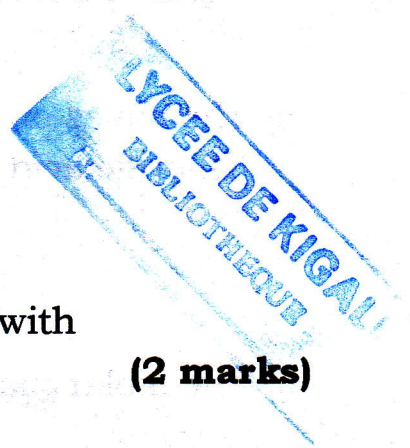
(b) Give the equation of the reaction between  $\text{MCO}_3$  and  $\text{HCl}$  and show the physical states of the reactants and the products: **(2 marks)**

(c) The number of moles of 1M  $\text{NaOH}$  that reacted with excess  $\text{HCl}$  = **(2 marks)**

(d) Give the equation of the reaction between  $\text{NaOH}$  and  $\text{HCl}$  and show the physical states of the reactants and the products = **(2 marks)**

(e) The mole ratio of  $\text{NaOH} : \text{Cl}$  = ...../..... **(1 mark)**

(f) Therefore, the moles of the excess of  $\text{HCl}$  = **(1 mark)**



(g) The moles of HCl that reacted with  $\text{MCO}_3 =$  **(2 marks)**

(h) The mole ratio of  $\text{MCO}_3$ : HCl = ..... : ..... **(1 mark)**

(i) The moles of  $\text{MCO}_3$  that reacted with hydrogen Chloride acid = **(2 marks)**

(j) The molar mass =  $\frac{\text{Mass(g)}}{\text{Number of moles}}$

Therefore the molar mass of  $\text{MCO}_3 =$  **(2 marks)**

(k) The atomic mass (Ar) of M: **(3 marks)**