

Name: ..... Adm No. ....

Class: ..... Date: .....

233/3

**CHEMISTRY**

**PAPER 3**

**FORM III**

**END TERM 2 EXAMS**

**Time: 2 hours**

233/3

CHEMISTRY

**FORM III**

**INSTRUCTIONS TO THE CANDIDATES:-**

- Write your **name** and admission **number** on the spaces provided.
- Answer *all* the questions in the spaces provided.
- Mathematical tables and electronic used calculators may be
- All working **MUST** be clearly shown where necessary.

<b>Question</b>	<b>Maximum score</b>	<b>Candidate's score</b>
1	20	

1. You are provided with:

- Solution A – containing 21.2g per litre of anhydrous sodium carbonate ( $\text{Na}_2\text{CO}_{3(s)}$ )
- Solution B – Nitric (V) acid solution
- Solution C – metal hydroxide  $\text{M}(\text{OH})_x$

### Procedure 1

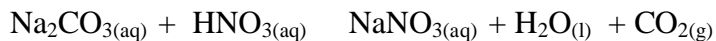
- Fill the burette with solution B
- Using a pipette, transfer  $25\text{cm}^3$  of solution A into a clean conical flask and add 1-2 drops of methyl orange indicator.
- Titrate with solution B from burette.
- Repeat the titration to obtain accurate results and record the data in the table below.

(4 marks)

Titre	I	II	III
Final burette reading ( $\text{cm}^3$ )			
Initial burette reading ( $\text{cm}^3$ )			
Volume of solution B used ( $\text{cm}^3$ )			

- a) Find the average volume of solution B used. (1 mark)

b) Given that the equation for the reaction is



Calculate;

- (i) The number of moles of sodium carbonate in  $25\text{cm}^3$  of solution A (3 marks)

(ii) The number of moles of the acid in the titre volume obtained. (1 mark)

c) Hence find the molarity of nitric (V) acid solution B. (1 mark)

**Procedure II**

- i) Pipette  $25\text{cm}^3$  of solution C into a clean conical flask.
- ii) Add 1-2 drops of methyl orange indicator.
- iii) Titrate with solution b.
- iv) Repeat the titration to obtain accurate results and fill the table below.

(4 marks)

Table II

Titre	I	II	III
Final burette reading ( $\text{cm}^3$ )			
Initial burette reading ( $\text{cm}^3$ )			
Volume of solution B used ( $\text{cm}^3$ )			

a) Find the average titre volume of solution B used. (1 mark)

b) Calculate;

i) The number of moles of solution B used in the reacting volume. (1 mark)

ii) The number of moles of solution C in  $25\text{cm}^3$  of the the solution. (1 mark)

c) Determine the equation for the reaction between the hydroxide  $\text{M}(\text{OH})_x$  and nitric (V) acid. (2marks)

d) What is the value of x in  $\text{M}(\text{OH})_x$  ? (1 mark)

## Confidential

Each candidate requires;

- ✓ About 100cm<sup>3</sup> of Solution A containing 21.2g per litre of anhydrous sodium carbonate (Na<sub>2</sub>CO<sub>3(s)</sub>).
- ✓ About 150 cm<sup>3</sup> of 0.3M Nitric (V) acid solution B
- ✓ About 100cm<sup>3</sup> of 0.2M sodium hydroxide solution C.
- ✓ 50cm<sup>3</sup> burette
- ✓ 25cm<sup>3</sup> pipette
- ✓ A clamp, boss and stand
- ✓ Methyl range indicator
- ✓ 3 conical flasks
- ✓ White tile.