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.

Question	**Maximum score**	**Candidate's score**
1	20	

1. You are provided with:

   - Solution A – containing 21.2g per litre of anhydrous sodium carbonate ($Na_2CO_{3(s)}$)
   - Solution B – Nitric (V) acid solution
   - Solution C – metal hydroxide $M(OH)_x$

Procedure 1

i) Fill the burette with solution B

ii) Using a pipette, transfer 25cm^3 of solution A into a clean conical flask and add 1-2 drops of methyl orange indicator.

iii) Titrate with solution B from burette.

iv) Repeat the titration to obtain accurate results and record the data in the table below.

(4 marks)

Titre	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution B used (cm^3)			

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

b) Given that the equation for the reaction is

$Na_2CO_{3(aq)} + HNO_{3(aq)} \quad NaNO_{3(aq)} + H_2O_{(l)} + CO_{2(g)}$

Calculate;

(i) The number of moles of sodium carbonate in 25 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 25cm^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 (cm^3)			
Initial burette reading (cm^3)			
Volume of solution B used (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 $25cm^3$ of the the solution. (1 mark)

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

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

Confidential

Each candidate requires;

- ✓ About 100cm_3 of Solution A containing 21.2g per litre of anhydrous sodium carbonate ($Na_2CO_{3(s)}$.
- ✓ About 150 cm_3 of 0.3M Nitric (V) acid solution B
- ✓ About 100cm^3 of 0.2M sodium hydroxide solution C.
- ✓ 50cm^3 burette
- ✓ 25cm^3 pipette
- ✓ A clamp, boss and stand
- ✓ Methyl range indicator
- ✓ 3 conical flasks
- ✓ White tile.