NAME: ……. **ADM NO. ……**
233/3 **DATE: ……..**
CHEMISTRY
PAPER 3 FORM 3
(PRACTICAL)
2 ¼ HRS

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FORM THREE CHEMISTRY PAPER 3

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in the question paper.
b) You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
c) All working must be clearly shown.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	16	
2	14	
3	10	
TOTAL SCORE	**40**	

1. You are provided with:
   - 0.2 M Sodium Hydroxide solution
   - X M hydrochloric acid solution X
   - Y M Na_2CO_3 solution Y

You are required to standardize hydrochloric acid and hence determine the concentration of sodium carbonate.

PROCEDURE I

Using a pipette transfer 25cm^3 of 0.2M Sodium hydroxide into a conical flask. Add 2-3 drops of phenolphthalein indicator and then titrate with hydrochloric acid provided in a beaker from a burette. Shake the conical flask after each addition and note the volume required to neutralize the sodium hydroxide solution. Record your results in the table below.

(3 mks)

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

a) What is the average volume of solution X used? (1 mk)

b) Calculate the number of moles of solution X required to completely neutralize 25cm^3 of sodium hydroxide solution. (2 mks)

c) What is the morality of the hydrochloric acid, solution X? (2 mks)

PROCEDURE II

Rinse the pipette thoroughly then pipette 25cm^3 of sodium carbonate into a conical flask. Add 2-3 drops of phenolphthalein indicator. Refill the burette with hydrochloric acid and use it to titrate the contents of the conical flask. Shake the flask after each addition of the acid and note the volume of the acid required to neutralize 25cm^3 of the sodium carbonate. Record your results in the table below.

(3 mks)

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

d) What is the average volume of hydrochloric acid used in the second procedure? (1 mk)

e) Calculate the number of moles of sodium carbonate in 25cm^3 of solution. (2 mks)

f) Calculate the concentration of sodium carbonate in moles per litre. (2 mks)

2. You are provided with solid A. Carry out the tests below. Identify any gas or gases produced and record your observations and inferences.

a) Heat gently a spatula endful of solid A in a dry test tube. Test the gas with red and blue litmus paper.

Observations	Inferences
(2 mk)	(2 mk)

b) Place a spatula endful of solid A in a boiling tube. Add 10cm^3 of distilled water. Filter off the residue. Divide the filtrate into two portions. Retain the residue.

(i) To the first portion add 3 drops of ammonia solution and then excess.

Observations	Inferences
(1 mk)	(1 mk)

(ii) To the second portion add 3 drops of Lead (ii) nitrate solution.

Observations	Inferences
(1 mk)	(1 mk)

c) To the residue obtained in (b) above add 5cm^3 of dilute nitric acid. Divide the solution into two portions.

Observations	Inferences
(1 mk)	(1 mk)

(i) To the first portion add 3 drops of Ammonia solution and then excess.

Observations	Inferences
(1 mk)	(1 mk)

(ii) To the second portion add 3 drops of lead (ii) nitrate solution.

Observations	Inferences
(1 mk)	(1 mk)

3. You are provided with solid M. carry out the tests below and record your observations and inferences in the spaces provided.

a) i. Place a half spatula of solid M in a non-luminous flame of a Bunsen burner.

Observations	Inferences
(1 mk)	(1 mk)

(b) Place the remaining solid M in a boiling tube and add $8cm^3$ of water. Divide the solution into 4 portions.

(i) Place the remaining solid **M** in a boiling tube and add $8cm^3$ of water.

Observations	Inferences
(1/2 mk)	(1/2 mk)

ii. To the first portion, add 3 drops of acidified potassium manganate(vii)

Observations	Inferences
(1 mk)	(1 mk)

iii. To the second portion, add 3 drops of acidified potassium dichromate (vi) and warm.

Observations	Inferences
(1 mk)	(1 mk)

iv. To the third portion, add a little sodium hydrogen carbonate.

Observations	Inferences

(1/2 mk)	(1/2 mk)

v. To the fourth portion, add 3 drops of universal indicator and determine the PH of the solution.

Observations	Inferences
(1 mk)	(1 mk)