

Adm..... Name..... Class.....

**GATITU SECONDARY SCHOOL P.O.BOX 327-0130 GATUNDU
FORM THREE CCHEMISTRY PAPER 3 TERM 3 2014.**

Question number	Maximum score	Students score
1	16	
2	12	
3	10	
TOTAL SCORE	40	

You are provided with

- (a) Solution M which is 2M sodium hydroxide.
- (b) Solution N which is a dibasic acid whose concentration is 9.8gdm^{-3} with a general formula H_2A .
- (c) Apparatus for titration
- (d) Distilled water

You are required to

- I. Prepare solution P**
- II. Determine molar mass of the dibasic acid in solution N.**
- III. Determine formula mass of the acid radical (A) in the dibasic acid in solution N.**

Procedure I

Using a pipette, transfer 25cm^3 of **solution M** into the 250cm^3 volumetric flask. Add distilled water to make up the volume to 250cm^3 . Swirl the volumetric flask five times to make a uniform solution. Label this solution as **solution P**. Use it for procedure II below.

- (a) Calculate the concentration of **solution P**, (which you have prepared) in moles per dm^3 (i.e molarity of solution P). (2mks)

Procedure II

Fill the burette with **solution N**.

Pipette 25cm^3 of **solution P** into a 250ml conical flask. Add three drops of phenolphthalein indicator. Titrate with **solution N** from the burette. Record your final and initial burette reading in the table below and complete the table. Repeat the titration two more times.

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

- (a) Calculate the average volume of solution N used. (4mks)
(1mk)

- (c) Calculate
 (i) the number of moles of sodium hydroxide in the 25cm^3 of **solution P**. (2mk)

(ii) the number of moles of the dibasic acid in the average volume of **solution N** used given that **two moles of sodium hydroxide reacts with one mole of the dibasic acid.** (1mk)

(iii) the number of moles of the dibasic acid in 1000cm^3 of **solution N.** (2mk)

(iv) the relative formula mass of the dibasic acid. (2mk)
(NB. concentration of the dibasic acid was 9.8gdm^{-3})

(v) the formula mass of the acid radical **A** in the formula $\text{H}_2\text{A}.$ (2mk)

Question 2. Qualitative analysis (inorganic salts)

You are provided with **solid Q.** Carry out the experiment in tables below. Write your observations and inferences in the spaces provided.

(a) Note the appearance of **solid Q.**

Observation	Inferences
(1mk)	(1mk)

(b) Put all the solid Q in a clean dry test tube. Add about 10cm³ of distilled water. Shake the test- tube well. Retain this solution for the next tests.

Observation	Inferences
(1mk)	(1mk)

I. Divide the resulting solution into three portions.

(i) To the first portion, add 2M sodium hydroxide dropwise till in excess.

Observation	Inferences
(1mk)	(1mk)

(ii) To the second portion add 2M ammonia solution dropwise till in excess.

Observation	Inferences
(1mk)	(1mk)

(iii) To the third portion, add three drops of 0.5M Barium nitrate solution. Record your observations. Add excess 2M nitric acid to the mixture and shake.

Observations	Inferences
(1mk)	(1mk)

(iv) To the fourth portion add three drops of lead nitrate solution. Add to the mixture about 5cm³ of distilled water shake and warm the mixture.

Observations	Inferences
(1mk)	(1mk)

(v) To the fifth portion add three drops of potassium iodide solution

Observation	Inferences
(1mk)	(1mk)

II. Write the formula of the **cation** and **anion** present in solid Q

Cation (1mk)

Anion (1mk)

Question 3. Qualitative analysis (Organic compounds)

You are provided with **solid R**. Carry out the experiment in tables below. Write your observations and inferences in the spaces provided.

(a) Put about one –third of solid R on the end of a clean metallic spatula and heat it with a Bunsen burner's flame.

Observation	Inferences
(1mk)	(1mk)

(b) Place the remaining amount of solid R in clean boiling tube. Add about 10cm³ of distilled water. Shake well. Divide the solution into **four portions**.

(i) To the first portion add **3 drops** of bromine water

Observations	Inferences
(1mk)	(1mk)

(i) To the second portion add **3 drops** of acidified potassium manganate (VII).

Observations	Inferences
(1mk)	(1mk)

(ii) To the third portion add a spatula end full of sodium hydrogen carbonate

Observations	Inferences
(1mk)	(1mk)

(iii) Dip a blue and red litmus papers in the fourth portion

Observations	Inferences
(1mk)	(1mk)