NAME:……

SIGNATURE: ……..INDEX: ……../……

P545/ CHEMISTRY

Paper 3

September 2022

2Hrs 45Mins

NATIONAL ASSOCIATION OF CHEMISTYR TEACHERS

Uganda Certificate of Education

CHEMISTRY

Paper 3

DURATION: 2HRS 45MINS

INSTRUCTIONS TO CANDIDATES

Answer both questions. Answers are to be written in the spaces provided in this booklet.

Use blue ink ball pen only. Any work done in pencil will not be marked except drawings.

You are not allowed to use any reference books (i.e. text books, booklets on qualitative analysis etc

All working must be clearly shown

1. *You are provided with the following;*

BA_1 *which contains* ***3.15g*** *of the dibasic acid, $H_2Y.2H_2O$ in 500$cm^3$of solution.*

BA_2 *which contains* ***4.8g*** *of impure sodium hydroxide in one liter of solution.*

(*2molesS of* ***BA_2*** *react with 1mole of* ***BA_1)***

Procedure:

Pipette 25 or 20cm^3 of ***BA_2*** *into a conical flask. Add 2 to 3 drops of phenolphthalein indicator and titrate with* ***BA_1*** *from the burette until the end point is reached. Repeat the titration until consistent results are obtained. Record your results in the table below.*

Volume of the pipette used: ……..cm^3 *(1mark)*

Experiment	*1*	*2*	*3*
Final Burette reading (cm^3)			
Initial Burette reading (cm^3)			
Volume of ***BA_2*** *used (cm_3)*			

Values used to calculate average volume ***BA_1*** *used ……. and ……*

Average Volume of ***BA_1*** *used: ……..*

a) *Calculate the molarity of the dibasic acid, $H_2Y.2H_2O$.*

(H=1, Y=88, O=16)

……

……

……

……

……

……

……

……

b) *Calculate the;*

i) Number of moles of ***BA_1*** *that reacted*

……

……

……

……

ii) Concentration of pure sodium hydroxide in ***BA_2*** *in grams per liter.*

(Na= 23, 0= 16, H-= 1)

……

……

……

……

……

c) *Determine the;*

i) Percentage purity of the sodium hydroxide used in the preparation of ***BA_2****.*

……

……

……

……..

ii) *Percentage of the impurity in the sodium hydroxide sample used in the preparation of* ***BA_2.***

……

……

……

……

2. *You are provided with substance **G**, which contains two cations and one anion. Carryout the following tests to identify them. Identify any gases which may be evolved. Write your observations and deductions.*

Test	*Observation*	*Deduction*
a) Heat a spatula endful of G in a dry test tube strongly until there is no further change.		
b) To a spatula endful of G, add 4cm^{3}of dilute nitric acid, keep the resultant solution for part (G).		
c) To 3cm^3 of the resultant solution obtained in (b) above, add 7cm^3 of dilute sodium hydroxide solution, shake well and then filter. Keep both the filtrate and residue.		
d) To the filtrate obtained in (G) above, add dilute nitric acid drop by drop until the solution is just acidic. Divide the resultant solution into three parts.		
i) To the second parts,		

	add dilute ammonium hydroxide solution drop wise until in excess.		
ii)	*To the second parts, add dilute ammonium hydroxide solution drop wise until in excess.*		
iii)	*To the third part, add a few drops of potassium iodide solution.*		
e)	*To the residue obtained in (G) above, add dilute nitric acid until the residue just dissolves. Divide the resultant solution into three parts.*		
i)	*To the first part, add dilute sodium hydroxide solution drop wise until in excess.*		

ii)	*To the second part, add Zinc powder and warm gently.*		
iii)	*To the third part, add dilute ammonium hydroxide solution drop wise until in excess.*		

*Cations in **G**: …… and ……*

*Anions in **G**: ……*

END