

P525/3
CHEMISTRY (PRACTICAL)
PAPER 3
2023
3 ¼ Hours

Uganda Advanced Certificate of Education
CHEMISTRY PRACTICAL
PAPER 3

3 Hours 15 Minutes

INSTRUCTIONS TO CANDIDATES:

Answer all questions

Record your answers on this question paper in the spaced provided

Mathematical tables and silent non programmable calculators may be used

Reference books a should not be used

Candidates are NOT allowed to start working with the apparatus for the first 15 minutes

This time is to enable candidates to read the question paper and make sure they have all the apparatus and chemicals that they may need.

FOR EXAMINERS USE			
Q1	Q2	Q3	TOTAL

NO.1. You are provided with the following

FA₁ which is aqueous ammonia

FA₂ which is trichloro methane

FA₃ which is 0.5M hydrochloric acid

FA₄ which is 0.05M hydrochloric acid

You are required to determine the distribution (Partition) coefficient of ammonia between water and trichloro methane

Procedure.

Add 10cm³ of **FA₁** to 50cm³ of **FA₂** in a conical flask. To this mixture add 50cm³ of distilled water. Shake the mixture vigorously for about 5 minutes allow the mixture to stand for 10 minutes.

Carefully decant the upper (aqueous) layer into a boiling tube or beaker.

Transfer the lower (organic) layer into another boiling tube or beaker and cover.

Read and record room temperature in the results.

- (i) Pipette 10cm³ or (use measuring cylinder) of the aqueous layer into a clean conical flask.

Add 2 to 3 drops of phenolphthalein indicator and titrate with **FA₃**.

Repeat the titration until you obtain consistent results.

Record your results in table 1.

Results:

Room temperature -----
°C (½ marks)

Pipette volume -----cm³
(½ marks)

Final burette reading (cm ³)			
Initial Burette Reading (cm ³)			
Volume of FA ₃ used cm ³			

(3marks)

Average volume of FA₃ used -----cm³
(2½ marks)

- (ii) Pipette 10cm³ of the organic layer into a clean conical flask.
Add 2 to 3 drops of phenolphthalein and titrate it with FA₄. Repeat the titration until you obtain consistent results.

Record your results in table II

Pipette volume -----cm³
(1/2 mark)

Final Burette reading (cm ³)			
Initial Burette Reading (cm ³)			
Volume of FA ₄ used (cm ³)			

Average volume of FA₄ used
..... cm³ (2 ½ marks)

QUESTIONS

- (a) Calculate the molar concentration of ammonia in the aqueous layer

(3

½ marks)

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- (b) Calculate the molar concentration of ammonia in the organic layer

(3

½ marks)

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(c) Determine the value of the distribution deficient of ammonia between water and trichloromethane at the temperature you have recorded

[illegible]

TESTS	OBSERVATION	DEDUCTIONS
a) Heat aspatula endful of F in a dry test tube		
b) To two spatula endful of F is shaken with about 10cm ³ of water, the mixture is		

filtered keep both the filtrate and residue		
c) (i) Divide the filtrate into five(5) portions. To the first part dilute NaOH is added drop wise until excess		
ii) To the second part aqueous ammonia is added drop wise until excess		
iii) To the third part a concentrated solution of potassium thiocyanate is added		
iv) To the fourth part, 3 drops of lead nitrate solution is added and warm.		
v) Use the fifth portion to carry out a test of your choice to confirm the anion present		
d) The residue is washed. then dilute HCl acid, added drop wise until there is no further change, divide the resultant solution into four portions		
(i) To the first part		

	add lead ethanoate solution then warm the mixture		
(ii)	To the second part add dilute NaOH solution drop wise until excess and heat		
(iii)	To the third part, add aqueous ammonia dropwise until excess		
(iv)	To the fourth part add aqueous potassium iodide solution		

e) (i) The anions in **F** -----and -----

(ii) The cations in **F** are -----

- 3.** You are provided with substance **K** which is an organic substance. Determine the nature of **K** carry out the following tests and record your observations and deductions in the table below
(14marks)

TESTS	OBSERVATIONS	DEDUCTIONS
a) Burn a small amount of K on spatula or porcelain dish		
b) (i) Divide the		

remaining into five portions. To the first portion add water and test with litmus		
(ii) To the second portion add 1 -2 drops of neutral iron(III) chloride solution		
c) To the third part of the mixture from (b) (ii) above add 2 -3 drops of acidified potassium dichromate (VI) solution, heat the mixture and divide the solution into two parts.		
(ii) To the first part of the solution add 2 -3 drops of Brady's reagent		
(iii) To the second part of the solution add 2 -3 drops of Tollens reagent and warm		
d) To the fourth portion of original K add Brady's reagent solution		
e) To the fifth portion add 2cm ³ conc H ₂ SO ₄ . Heat the mixture and bubble any		

vapour evolved through acidified potassium manganate (VII) solution		
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Comment on the nature of **K**

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END