Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2013
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

Instructions to Candidates

- *Answer all questions.*
- *All answers must be written in the spaces provided in this booklet.*
- *You are **not** allowed to use any reference books i.e text books or handouts on qualitative analysis etc.*
- ***All working must be clearly shown.***
- *Mathematical tables and silent non-programmable scientific calculators may be used.*

For Examiner's use only		
Q.1	Q.2	Total

Turn Over

1. You are provided with the following;
BA1 which is a solution containing 3.15g of a hydrated dibasic acid $H_2X.nH_2O$, in $250cm^3$ of the solution.
BA2 which is a 0.2 M sodium hydroxide solution.

You are required to determine the percentage of water of crystallization, **n**, in the hydrated acid.
(1 mole of acid reacts with 2 moles of sodium hydroxide)

Procedure

i) Pipette 25.0(or 20.0)cm^3 of **BA2** into a clean plastic beaker. Measure and record the initial temperature.

ii) Fill the burette with **BA1**, then run $10cm^3$ of **BA1** from the burette into the beaker containing **BA2.**
Gently stir the solution using the thermometer, and record the maximum temperature attained by the mixture.

iii) Repeat procedure (ii) above until $30cm^3$ of **BA1** has been added.

iv) Record your results in the table below.

Results

Volume of pipette used.....cm^3 ($^1/_2$mark)

Volume of **BA1** added (cm^3)	0	10	15	20	25	30
Maximum temperature attained (^{o}c)						
Temperature rise (^{o}c)						

(3mark)

Questions

(a) i) Plot a graph of temperature rise (along vertical axis) against volume of **BA1** added (along horizontal axis). ($5^1/_2$mark)
(USE A GRAPH PAPER, INSERT IT IN THE BOOKLET AND STAPLE IT).

ii) From your graph, determine the volume of **BA1** required for complete neutralization of **BA2.** ($^1/_2$mark)

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(b) Calculate the;
i) number of moles of **BA2** that reacted. (1mark)

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ii) concentration of the hydrated acid in **BA1** in moles per dm^3. ($1\frac{1}{2}$mark)

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iii) molar mass of the hydrated acid. (1mark)

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(c) i) Determine the volume of **n** in the hydrated acid (H=1, O=16, X= 88) (1mark)

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ii) Calculate the percentage of the water of crystallization in the acid $H_2X.nH_2O$. (1mark)

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2. You are provided with substance **U** which contains **two** cations and **one** anion. Carry out the following tests to identify the cations and anion in **U**. identify any gas(es) that may be evolved. Record your observations and deductions in the table below. (15marks)

TESTS	OBSERVATIONS	DEDUCTIONS
a)Heat a stapula end ful of **U** in a dry test tube until there is no further change		
b)To **two** stapula endfuls of **U**, add dilute hydrochloric acid until it just dissolves.		
c) To the solution from (b) above, add dilute sodium hydroxide solution drop wise until in excess. Filter and keep both the filtrate and the residue.		

d) Dissolve the residue in $3cm^3$ of dilute hydrochloric acid. Divide the solution into **two** parts. **(i)** To the **first** part, add dilute sodium hydroxide solution drop wise until in excess.		
ii) To the **second** part, add aqueous ammonia drop wise until in excess.		
e) Divide the filtrate into **three** parts. **i)** To the **first** part, add sodium hydroxide solution and warm gently.		
ii) To the **second** part, add lead (II) nitrate solution.		
iii) Use the **third** part of the filtrate to carry out a test of your own choice to confirm the anion in U.		

(f) i) Cations in U.....

ii) Anion in U.....

END

Name: .....Centre/Index No. .....

Signature .....

545/3
CHEMISTRY
Paper 3

July/August- 2009
2¼ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education
CHEMISTRY
Paper 3
2 Hours 15 Minutes

Instructions:

- Attempt both questions
- Write answers in the space provided

FOR EXAMINERS ONLY		
1	2	Total

1 You are provided with the following solutions:
BA1 which is a solution made by dissolving 2.65g of a salt M_2X in 250cm^3 of solution.
BA2 is 0.25M hydrochloric acid.

You are required to determine the formula mass of X in the salt by titration.

Procedure:
Pipette 20 or 25cm^3 of BA1 into a clean conical flask; add 2 drops of methyl orange indicator titrate with BA2. Repeat the titration and record your results in the table below

Volume of pipette used = ... cm^3

Burette readings	1	2	3
Final reading (cm^3)			
Initial reading (cm^3)			
Volume of BA2 used(cm^3)			

Titre values used for calculating average volume ....., ...cm^3

Average volume of BA2 used = ...cm^3

(a) Calculate the number of moles of BA2 that reacted.

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(b) Determine the morality of the salt (M_2X : HCl = 1:2)

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(c) Determine the value of X (M = 23)

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2. You are provided with solid X which contains two cations and one common anion. Carry out the following tests on X to identify the cations and anion in X. Identify any gasses evolved.

Test	Observations	Deduction
(a) Heat a spatula endful of X in a test tube gently then strongly until no further change.		
(b) Dissolve 2 spatula ends of X in about $5cm^3$ of distilled water. Filter, keep both the filtrate and residue Divide the filtrate into 5 portions.		
(i) To the 1st portion, add dilute sodium hydroxide solution drop wise till in excess		

	ii) To the 2nd portion, add aqueous Ammonia drop wise until in excess.		
	iii) To the 3rd portion, add lead nitrate solution and warm.		
	iv) Use the 4th portion to carry out a test of your own choice to confirm the anion present in the filtrate.		
(c)	Wash the residue and transfer it into a test tube. Add dilute nitric to the residue until it just dissolves. Divide the resultant solution 3 into portions.		

(i) To the 1st portion add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the 2nd portion, add aqueous ammonia drop wise until in excess.		
iii) To the 3rd portion, add potassium iodide solution.		

Cations X

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Anions in X

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END

Name.....Centre/ Index No.....

School..... Signature.....

545/3
CHEMISTRY
Paper 3
July/August-2010
2 hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

Paper 3

2 hours

Instructions to Candidates

- Answer **all** questions, writing your answers in the space provided.
- Students are not allowed to use text books and hand outs on qualitative analysis.
- Non-programmable silent scientific calculators may be used.

[X = 23, C = 12, O = 16, H= 1].

For Examiner's use only		
1	2	Total

Turn Over

1. You are provided with the following solutions.

BA1 is a solution made by dissolving 1.8 g of a metal carbonate $X_2CO_3.nH_2O$ in 250 cm^3 of solution.

BA2 is 0.05M hydrochloric acid solution.

You are required to determine the number of moles of water of crystallization, n in the carbonate.

Procedure

Pipette 20 or 25cm^3 of **BA1** into a clean titration flask, add 2 drops of Methyl orange indicator and titrate with **BA2** from a burette. Repeat the titration and record your results in the table below.

Volume of Pipette used = ...cm^3

Burette readings	1	2	3
Final reading (cm^3)			
Initial reading (cm^3)			
Volume of BA2 used (cm^3)			

Titre value used for calculating average volume....., ...cm^3

Average volume of BA2 used =.....cm^3

a) Calculate

i) the number of moles of hydrochloric acid that reacted.

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ii) the number of moles of the carbonate that reacted.

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b) Determine the value n in the carbonate $X_2CO_3.nH_2O$.

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2. You are provided with substance Z which contains **two** cations and **two** anions. Carry out the following tests on Z to identify the cations and anions in Z. Identify any gases evolved, record your observations and deductions in the table below.

a) Dissolve two spatula end of Z in about $10cm^3$ of water and shake. Filter: keep both the filtrate and residue. Divide the filtrate into 5 portions.		
i) To the 1st portion add sodium hydroxide solution drop wise until in excess.		
ii) To the 2nd portion add aqueous Ammonia drop wise until in excess.		
iii) To the 3rd portion add 2 drops of potassium iodide solution.		

iv) To the 4th portion add lead nitrate solution and warm. Allow to cool.		
v) Use the 5th portion to carry out a test of your own choice to identify the anion in the filtrate.		
b) Transfer the residue into a test tube and add dilute hydrochloric acid until the residue just dissolves. Divide the resultant solution into 2 portions.		
i) To 1st portion add sodium hydroxide solution drop wise until in excess.		
ii) To the 2nd portion add aqueous Ammonia drop wise until in excess.		

Cations: .....

Anions: .....

END

Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2012
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

Instructions to Candidates

- *Answer **all** questions.*
- *All answers must be written in the spaces provided.*
- *You are not allowed to use text books or hand outs on qualitative analysis etc.*
- *All working must be clearly shown.*
- *Silent Non-programmable silent scientific calculators may be used.*

For Examiner's use only		
Q.1	**Q.2**	**Total**

1. Your are provided with the following;
BA1 which is a solution containing 2g of sodium hydroxide in $500cm^3$ of solution.

BA2 is a 0.06M solution of an unknown acid Q.

You are required to determine the mole ratio between the acid and sodium hydroxide.

Procedure.

Pipette $25cm^3$ ($20cm^3$) of **BA1** into a conical flask. Add 2-3 drops of Phenolphalein indicator. Titrate it with **BA2** from the burette.

Repeat the titration until you obtain consistent results.

Record the results in the table below.

RESULTS.

Volume of pipette used..... cm^3 *(½mark)*

Final burette reading (cm^3)			
Initial burrete reading (cm^3)			
Volume of **BA2** used (cm^3)			

(3marks)

Volumes used to determine average volume of **BA2** *(1½ mark)*

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Average volume of **BA2** used.....

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(2marks)

Questions.

a) Calculate the number of moles of:
i) Sodium hydroxide solution used. (Na = 23, O = 16, H = 1) *(3½ mark)*

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ii) Acid used *(1 1/2 mark)*

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b) Determine the mole ratio between acid and sodium hydroxide. *(1 1/2 mark)*

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2. Your are provided with substance Y, which contains one cation and two anions. Carry out the following tests to identify the ions in Y. Identify any gas(es) that may be evolved.

Record your observations and deductions in the table below.

Test	Observations	Deductions.
a) Heat a spatula end full of Y strongly in a dry test tube. Keep the residue.		
b) Cool the residue from (a) above and add dilute nitric acid drop wise until the solid just dissolves, divide the resultant solution into three portions.		

i)	To the first portion, add dilute sodium hydroxide solution drop wise until in excess.		
ii)	To the second portion, add dilute ammonia solution drop wise until in excess.		
iii)	To the third portion, add 2-3 drops of potassium iodide solution.		
c).	To a spatula end full of Y, add dilute nitric acid drop wise until the solid just dissolves Divide the resultant solution into two portions.		
i)	To the first portion, add 3 drops of lead (II) nitrate solution.		
ii)	use the second portion to carry out a test of your own choice to confirm one of the anions in Y.		

d) Identify;

i) Cation in Y.....

ii) Anions Y i)..... ii) .....

END

Name..... Centre/ Index No.....

School..... Signature.....

545/3
CHEMISTRY
Paper 3
July/August 2011
2 hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

Paper 3

2 hours

Instructions to Candidates

- Answer **all** questions.
- All answers must be written in the spaces provided.
- Students are not allowed to use text books or hand outs on qualitative analysis.
- Non-programmable silent scientific calculators may be used.

For Examiner's use only		
1	2	Total

1. You are provided with the following solutions.

BA1 is a solution made by dissolving 2.65 g of a carbonate X_nCO_3 to make 250 cm^3 of solution.

BA2 is 0.2 M hydrochloric acid solution.

You are required to determine the value of n in the carbonate by titration.

Procedure:

Pipette 20 or 25 cm^3 of **BA1** into a clean titration flask, add 2 drops of Methyl orange indicator and titrate the mixture with **BA2** from a burette. Repeat the titration and record your results in the table below.

Volume of Pipette used = ... cm^3

Burette readings	1	2	3
Final reading (cm^3)			
Initial reading (cm^3)			
Volume of BA2 used (cm^3)			

Titre value used for calculating average volume ....., ... cm^3

Average volume of BA2 used =..... cm^3

a) Calculate

i) the number of moles of BA2 that reacted.

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ii) the number of moles of X_nCO_3 in 1000 cm^3 of solution. [X_nCO_3: HCl = 1:2]

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b) i) Determine the molar mass of the carbonate

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ii) What is the value of n in the carbonate X_nCO_3
(X = 27, C = 12, O = 16)

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2. You are provided with substance Z which contains **three** cations and **two** anions. You are required to identify the cations and anions in Z, identify any gases evolved.

Record your observations and deductions in the table below.

TEST	OBSERVATIONS	DEDUCTIONS
a) Dissolve two spatula ends of Z in about 5 cm^3 of distilled water and fitre. Keep both the filtrate and residue. Divide the filtrate into 3 portions.		
i) To the 1st portion add sodium hydroxide solution and filter. Warm the filtrate.		
ii) To the 2nd portion add lead(II) nitrate solution and warm.		
iii) Use the 3rd portion to carry out a test of your choice to confirm the anion in the filtrate.		
b) Transfer the residue into a test tube and dissolve it in a minimum amount of dilute hydrochloric acid. Divide the resultant solution into 2 portions.		
i) To the 1st portion add Sodium hydroxide solution drop wise until in excess.		
ii) To the 2nd portion add ammonia solution drop wise until in excess.		

c) Identify the cations and anions in Z

Cations: .....

Anions: .....

END

Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2015
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

Instructions to Candidates

- *Answer **both** questions. All answers must be written in the spaces provided in this booklet.*
- *You are **not** allowed to use any reference books (i.e text books or handouts on qualitative analysis etc).*
- ***All working must be clearly shown.***
- *Mathematical tables and silent non-programmable scientific calculators may be used.*

For Examiner's use only		
Q.1	Q.2	Total

1. You are provided with the following: Metal **Q** measuring about 7cm.
Z which is a 2.0M solution of dilute acid, **HX**.
You are required to determine the mass of metal **Q**.

Procedure

(a) (i) Measure and cut exactly 6cm of metal **Q** provided.

(ii) Using a measuring cylinder, measure 40cm^3 of solution **Z** and transfer it into a clean plastic beaker; note and record the initial temperature of this solution in the table provided below.

(iii) Place metal **Q** into solution **Z** in the plastic breaker and simultaneously start the stop clock.

(iv) Note and record the temperature of the contents in the beaker after every 30 seconds in the table below.

Results table

Time (seconds)	0	30	60	90	120	150	180	210
Temperature (^{0}C)								

(04marks)

Questions;

(b) Plot a graph of temperature against time.
(N.B: use a graph paper and insert it in here) (4½ mark)

(c) Determine the highest temperature rise. (01mark)

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(d) Calculate the amount of heat produced during the reaction.
(Assume: Specific heat capacity of solution = 4.2J/g/^{0}C,
density of solution = 1g/cm^3) (01mark)

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) Given that the molar heat of reaction between **Q** and acid **Z** is 1600KJ/mol, Calculate the:

(i) number of moles of **Q** that reacted. (02marks)

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(ii) Mass of **Q** used in this experiment (Q = 24). (01½marks)

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You are provided with substance **T** which contains **one** cation and **two** anions. Carry out the following tests on **T** to identify the ions present. Test for any gas(es) that may be evolved.

Record your observations and deductions in the table below. (16marks)

Test	Observation	Deduction
(a) Heat a spatula endful of **T** in a dry test tube.		
(b) Dissolve **two** spatula endfuls of **T** in about $5cm^3$ of distilled water and shake. Filter and keep both the filtrate and the residue.		

Turn Over

(c) Divide the filtrate into **three** portions. (i) To the **first** portion, add **three** drops of lead(II) nitrate solution.		
(ii) To the **second** part, add **three** drops of barium nitrate solution.		
(iii) Use the **third** part to carryout a test of your own choice to confirm one of the anions in **T**.		
(d) Wash the residue with distilled water and then add dilute nitric acid until it just dissolves. Divide the resultant solution into **two** parts. (i) To the first part, add sodium hydroxide solution drop wise until in excess.		
(ii) To the **second** part, add ammonia solution drop wise until in excess		

(e) Identify the;

(i) cation in T _____

(ii) anions in T _____ and _____

END

Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2017
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

INSTRUCTIONS TO CANDIDATES.

- *Answer **both** questions. All answers must be written in the spaces provided in this booklet.*
- *You are **not** allowed to use any reference books (i.e text books or handouts on qualitative analysis etc).*
- ***All working must be clearly shown.***
- *Mathematical tables and silent non-programmable scientific calculators may be used.*

For Examiner's use only		
Q.1	**Q.2**	**Total**

1. You are provided with the following:

BA_1 which is solution containing 0.1 moles of an acid H_nX per litre of solution.

BA_2 which is a solution prepared by dissolving 1.95g of sodium hydroxide in $500cm^3$ of distilled water.

You are required to determine the basicity of the acid (value of n in H_nX).

Procedure

Pipette accurately $20cm^3$ (or $25cm^3$) of BA_2 into a clean conical flask.

Add 2 to 3 drops of phenolphthalein indicator and titrate with BA_1 from the burette.

Record your results in table below.

Repeat the titration until you obtain consistent results.

Results;

Volume of pipette used_____cm^3 (2½ marks)

Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of BA_1 used (cm^3)			

Values used to calculated average volume of BA_1 used. (1½ marks)

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Average volume of BA_1 used. (02 marks)

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Questions:

a) Calculate the;

i) molarity of BA_2. (Na = 23, O = 16, H = 1) (2½ mark)

ii) number of moles of BA_2 that reacted. (01 mark)

iii) number of moles of BA_1 that reacted. (01 mark)

iv) mole ratio of BA_1 : BA_2; hence determine the value of n in H_nX. (1½ marks)

b) Write the equation of reaction between BA_1 and BA_2. (1½ marks)

You are provided with substance T, which contains two cations and one anion.
You are required to identify the cations and the anion in T and identify any gas or gases that may be evolved.

Turn Over

Record your observations and deductions in the table below. (16½ marks)

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat two spatula endfuls of T in a dry clean test tube until there is no further change.		
b) To the residue in (a) above, add 5cm^3 of dilute nitric acid and warm to dissolve.		
c) To 5cm^3 of the solution in (b) above, add excess ammonia solution, shake well and filter. Keep both the filtrate and residue.		
d) To 2cm^3 of the filtrate, add dilute hydrochloric acid drop wise until the solution is just acidic. Divide the acidic solution into two portions.		
i) To the first portion, add sodium hydroxide solution drop wise until in excess.		
ii) To the second portion, add ammonia solution drop wise until in excess.		
e) To the residue, add dilute nitric acid drop wise until it just dissolves. Divide the resultant solution into three parts.		
i) To the first part, add sodium hydroxide solution drop wise until in excess.		
ii) To the second part, add 5 drops of hydrochloric acid and warm.		
iii) Use the third part to carry out a test of your own to confirm the cation present.		
f) To one spatula endful of T, add drops of dilute nitric acid.		

g) Identify the;

i) cations in T: _____ and _____

ii) anion in T: _____

END

Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2018
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

INSTRUCTIONS TO CANDIDATES.

- *Answer both questions. All answers must be written in the spaces provided in this booklet.*
- *You are not allowed to use any reference books (i.e text books or handouts on qualitative analysis etc).*
- *All working must be clearly shown.*
- *Mathematical tables and silent non-programmable scientific calculators may be used.*

For Examiner's use only		
Q.1	Q.2	Total

1. You are provided with the following solutions.

BA1 which is a solution made by dissolving 8.05g of Potassium hydroxide in a little of distilled water and solution made up to 500cm^3.

BA2 which is a 0.25M solution of an acid HnY, prepared by dissolving 15.75g of acid in 500cm^3 of solution.

You are required to determine the basicity n, of acid HnY and hence the value of Y.
(K = 39, O = 16, H = 1)

Procedure.
Pipette 20.0cm^3 (or 25.0cm^3) of BA1 in a conical flask, add 2-3 drops of phenolphthalein indicator. Titrate with BA2 from the burette until when you obtain consistent results.

Record your results in the table below.

Volume of pipette used = _____ cm^3 (½ mark)

Experiment	1	2	3
Final burette reading(cm^3)			
Initial burette reading(cm^3)			
Volume of BA2 used (cm^3)			

(4½ marks)

Titre values used to calculate average volume of BA2

..... , ... cm^3 (1½ mark)

Average volume of BA2. (2½ marks)

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Questions
Calculate the;

(i) Molarity of BA1. (5 marks)

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(ii) Moles of BA1 that reacted (2 marks)

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(iii) Moles of BA2 that reacted. (2 marks)

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(iv) Value of n in HnY (1½ marks)

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(v) Value of Y in HnY (5½ marks)

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2. You are provided with substance T which contains two cations and one anion.
You are required to identify the cations and anion in T by carrying out the tests given below.
Identify any gas(es) that may be evolved. (25 marks)

Turn Over

Test	Observation	Dedications.
a) Heat a spatula endful of T in a dry clean test tube.		
b) Dissolve two spatula endfuls of T in about $4cm^3$ of distilled water.		
c) To the resultant solution in (b) above, add dilute sodium hydroxide solution drop wise until in excess. Filter, keep both the residue and filtrate.		
d) Divide the filtrate into three parts. (i) Warm the first part gently		
(ii) To the second part add Lead (I) nitrate solution and warm.		
(iii) Use the third part to carry out a test of your own choice to confirm the anion in T.		
e) Divide the residue into two parts. Heat the first part strongly in a tube until no further change.		
f) Place the second part in a test tube and add dilute hydrochloric acid drop wise until it just dissolves. Divide the resultant solution into 3 parts.		
(i) To the first part, add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the second part, add 2-3 drops of Potassium Iodide solution:		
(iii) To the third part add aqueous ammonia drop wise until in excess.		

g) Identify the:

(i) Cations in T.....

(ii) Anion in T.....

END

Name..... Centre/Index No.....

School..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August 2014
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

Instructions to Candidates

- *Answer **both** questions.*
- *All answers must be written in the spaces provided in this booklet.*
- *You are **not** allowed to use any reference books (i.e text books or handouts on qualitative analysis etc).*
- ***All working must be clearly shown.***
- *Mathematical tables and silent non-programmable scientific calculators may be used.*

For Examiner's use only		
Q.1	**Q.2**	**Total**

Turn Over

1. You are provided with **FA1** and **FA2**.
FA1 is a solution made by dissolving 2.0g of sodium hydroxide to make 500cm^3 of solution.
FA2 is a solution made by dissolving 13.2g of an impure dibasic acid H_2Y per litre of solution.

You are required to find the percentage purity of the acid.

PROCEDURE
Pipette 20cm^3 or 25cm^3 of **FA1**, transfer it into a clean conical flask. Titrate it against **FA2** from the burette using phenolphthalein indicator.
Repeat this procedure until you obtain consistent results.
Record your results in the table below
Results
Volume of pipette used _____ cm^3 ($^1/_2$mark)

Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of **FA2** used (cm^3)			

(2marks)

Values of **FA2** used to calculate the average volume..... ($1^1/_2$mark)

Average volume of **FA2** used .....cm^3 (2marks)

Questions;

(a) Write equation for reaction between **FA2** and **FA1**. ($1^1/_2$marks)

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(b) Calculate the number of moles of **FA1** that reacted with **FA2**. (3marks)

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(c) Calculate the number of moles of **FA2** present in a litre of the solution. ($1\frac{1}{2}$marks)

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(d) Calculate the mass of the pure acid in the sample. Hence the percentage purity. (Y = 96, H = 1) (2marks)

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2. You are provided with substance **Q** which contains **two** cations and **one** Anion. Carry out the following tests to identify the cations and Anions in **Q**. Identify any gas(es) that may be evolved.
Record your observations and deductions in the table below. (16marks)

	Test	Observation	Deduction
(a)	Heat **one** spatula endful of **Q** in a dry test tube until there is no further change.		
(b)	Dissolve two spatula endfuls of **Q** in about $5cm^3$ of distilled water. To the resultant solution, add aqueous ammonia drop wise until in excess. Filter and keep both the filtrate and the residue.		
(c)	Add dilute nitric acid to the filtrate until it is just acidic, divide the filtrate into **two** portions.		

	(i) to the **first** portion, add dilute sodium hydroxide solution until in excess.		
	(ii) to the **second** portion add aqueous ammonia drop wise until in excess.		
(d)	Wash the residue from (b) with distilled water, and dissolve it in dilute nitric acid. 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 aqueous ammonia drop wise until in excess.		
	(iii) Use the **third** part to confirm the cation in the residue.		

Identify the

(i) Cations in **Q** _____

(ii) Anion in **Q** _____

END