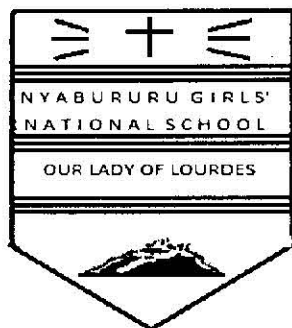


NAME.....CLS.....C/NO.....ADM.....



DATE DONE.....

INVIGILATOR.....

DATE RETURNED.....

DATE REVISED.....

CHEMISTRY PP 3
MARCH SERIES 2016
FORM FOUR
TIME: 2 ½ HOURS

INSTRUCTIONS

- ❖ Answer all questions in the spaces provided.
- ❖ You are required to spend the 15 min of the 2 ½ hrs allowed for this paper reading the whole paper carefully before commencing your work.
- ❖ Check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.
- ❖ All workings must be clearly shown.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	22	
2	11	
3	07	
TOTAL	40	

1. You are provided with Sodium hydroxide labelled A, 0.1M hydrochloric acid labelled B, Carboxylic acid labelled C, Solution D prepared by diluting 25cm^3 of solution A with distilled water to 250cm^3 of solution.

PROCEDURE 1

- (i) Fill the burette with solution B.
- (ii) Pipette 25cm^3 of solution D into a conical flask.
- (iii) Add a few drops of phenolphthalein indicator and titrate with B.
- (iv) Repeat the procedure above to get 2 more values.
- (v) Record the result in the table 1 below.

Table 1

Titre	1	2	3
Final burette reading			
Initial burette reading			
Volum of B used (cm^3)			

(4 Mks)

1. Determine the average volume of B used.

(1 Mk)

2. What is the molarity of Sodium hydroxide in;

- (a) Solution D.

(2 Mks)

- (b) Solution A.

(2 Mks)

PROCEDURE 2

- (i) Place solution C in a clean burette. Transfer 16 cm^3 of C into a plastic beaker.
Note the initial temperature of this solution and note it in the table 2 below.
- (ii) Measure 4 cm^3 of solution A using a measuring cylinder and add it into the solution C in the plastic beaker.
- (iii) Stir the mixture with the thermometer immediately and note the highest temperature reached.

Repeat the experiment with the other volumes of A and C as shown in the table below and complete it.

NB: Always rinse the thermometer and plastic beaker with distilled water after each experiment.

Table 2

Volume of solution c cm^3	16	12	8	6	4	2
Volume of solution A (cm^3)	4	8	12	14	16	18
Final temperature ($^{\circ}\text{C}$)						
Initial temperature ($^{\circ}\text{C}$)						
Change in temperature						

3. On the grid provided, plot a graph of temperature change (Y-axis) against volume of sodium hydroxide A (x – axis) (4 Mks)
4. From the graph determine the volume of Sodium hydroxide A used to neutralize the carboxylic acid. (1 Mk)
5. Determine the volume of carboxylic used for neutralization. (1 Mk)
6. Calculate the ratio between the volume of A and the volume of c at the end point of the reaction. (1 Mk)
7. Calculate the concentration of the carboxylic acid C (assuming that the volume ratio is the same as the mole ratio). (2 Mks)

8. Hence calculate the molar enthalpy of neutralization between acid C and solution A using the expression.

$$M \times S H C \times D T$$

Where M = mass of solution

$$S H C = 4.2 J / g / ^\circ C$$

D T = Highest temperature change. Assume that the density of the solution is $1 g / cm^3$.

(4 Mks)

Question 2

You are provided with solid N. Carry out the tests below. Write your observations and inferences in the spaces provided.

- (a) Heat about one third of solid N in a clean dry test – tube.

Test the gases produced with both blue and red litmus papers.

Observations	Inferences
(2 Mks)	(1 Mk)

- b. Using a boiling tube, dissolve the rest of solid N in about $10 cm^3$ of distilled water and use the solution for the tests below.

- (i) To about $2 cm^3$ of the solutions, add aqueous ammonia drop wise until in excess.

Observations	Inferences
(1 Mk)	(1 Mk)

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(ii) To 2 cm³ of the solution, add about 5cm³ of solution P (Aqueous sodium chloride).

Observations	Inferences
(1 Mk)	(1 Mk)

(iii) To 2 cm³ of solution, add about 4 cm³ of aqueous barium nitrate.

Observations	Inferences
(1 Mk)	(1 Mk)

(iv) To the mixture obtained in (iii) above, add about 2 cm² of dilute hydrochloric acid.

Observations	Inferences
(1 Mk)	(1 Mk)

Question 3

You are provided with liquid M. You are required to carry out the tests below.

(i) Dip blue and red litmus paper in liquid M.

Observations	Inferences
(1 Mk)	(1 Mk)

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(ii) To 2 cm³ of potassium dichromate add an equal volume of M in the test tube.

Observations	Inferences
(1 Mk)	(1 Mk)

(iii) Dip a clean rod into liquid M and burn it in a non-luminous flame of the Bunsen burner.

Observations	Inferences