

NAME:.....INDEXDATE.....

SCHOOL: SIGNATURE.....

233/3
CHEMISTRY
PAPER 3 / PRACTICAL
JULY / AUGUST, 2010
2¼ HOURS

BELGUT/AINAMOI JOINT EXAMINATION Kenya Certificate of Secondary Education 2010

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CHEMISTRY
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INSTRUCTIONS TO CANDIDATES

- ❖ Write your name, index number, name of the school and the date in the spaces provided.
- ❖ You are required to spend 15 minutes of the 2¼hrs reading through the paper and make sure that you have all the apparatus and chemicals needed for the practical.
- ❖ Answer all the questions in the spaces provided after each question
- ❖ Electronic calculators and mathematical tables may be used
- ❖ All working must be clearly shown where necessary.

For Examiners' use only

Question	Maximum score	Candidates score
1	12	
2	13	
3	15	
Total	40	

1. You are provided with solution A containing 5.3g dm^{-3} of Sodium carbonate, Na_2CO_3 in 1 dm^3 and solution B, Hx acid made by dissolving 7.3gms of Hx in 1 litre

You are supposed to standardize solution B using A.

$$(Na = 23.0, C=12.0, O= 16.0)$$

Procedure

Fill the burette with solution B (dilute Hx acid) provided. Pipette 25.0 cm^3 of solution A and transfer into a conical flask. Titrate until the yellow colour of the indicator turns pink. (*Place the conical flask on the white tile*). Record your results in the table I below. Repeat the procedure to complete the table.

- a) Table I

Titre	1	2	3
Final burette reading (cm^3)			
Initial Burette reading (cm^3)			
Volume of solution B (cm^3)			

(4mks)

- a) Calculate the average volume of solution B

(1mk)

- b) Calculate the molarity of solution A

(2mks)

- c) Calculate the molarity of solution B

(3mks)

- d) Calculate the relative formula mass of x

(2mks)

2. You are provided with:

- Solution W.
- Zinc powder, labelled solid Q.

You are required to determine the concentration of solution W in moles per litre.

Procedure

Using a measuring cylinder, measure 50 cm³ of solution W and transfer into 100cm³ plastic beaker. Take the initial temperature of the solution and record it in the table below under time = 0. Add all solid Q at once to the solution in the beaker and start a stop watch immediately. Stir well and take the temperature of the mixture after half – minute up to the sixth minute.

Record your results in table II below.

b) Table II

a)

Time (min)	0	½	1	1½	2	2 ½	3	3 ½	4	4 ½	5	5 ½	6
Temperature (°C)													

(4mks)

b) i) On the grid provided graph paper plot a graph of temperature in y – axis against time.

(4mks)

Grid

ii) Using the graph, determine the highest temperature change, ΔT . (1mk)

c) Calculate the amount of heat given out during the reaction. (*Assume density of solution = 1.0 g/cm^3 , specific capacity of the solution = $4.2 \text{ J g}^{-1} \text{ K}^{-1}$*) (2mks)

d) Given that the molar heat of the reaction between solution W and Zinc is 130 KJ Mol^{-1} , calculate the;

i) Number of moles W that were contained in 50 cm^3 of solution W. (1mk)

ii) Concentration of solution W in moles per litre. (1mk)

3. You are provided with 10cm³ of solution T. Solution T contains two cations and two anions. Carry out the tests below and record your observations and inferences in the spaces provided.

a) Add 15cm³ of 2M aqueous sodium hydroxide to all of solution T provided. Shake well. Filter the mixture into a boiling tube. Retain the filtrate.

Observations	Inferences
(2mks)	(1mk)

b) i) To about 3cm³ of the filtrate, add 2M Nitric acid drop wise until in excess. Retain the mixture.

Observations	Inferences
(2mks)	(1mk)

Divide the mixture in b (i) above into two portions.

ii) To the first portion, add aqueous Sodium hydroxide drop wise until in excess.

Observations	Inferences
(2mks)	(1mk)

iii) To the second portion, add aqueous Ammonia drop wise until in excess.

Observations	Inferences
(1mk)	(1mk)

c) To 2cm³ of the filtrate, add 4 drops of acidified Barium chloride.

Observations	Inferences
(1mk)	(1mk)

d) To 2 cm³ of the filtrate add about 1cm³ of aqueous Sodium hydroxide followed by a small piece of Aluminium foil. Warm the mixture gently and carefully.

Observations	Inferences
(1mk)	(1mk)