

NAME:.....

INDEX NO:.....

SIGNATURE.....

DATE.....

233/3

**CHEMISTRY**

PRACTICAL

Paper 3

JULY/AUGUST 2014

TIME: 2¼ HOURS

**NAKURU DISTRICT SECONDARY SCHOOLS TRIAL EXAMINATION- 2014**

Kenya Certificate of Secondary Education

**CHEMISTRY**

Paper 3

PRACTICAL

2¼ HOURS

**Instruction to Candidates**

1. Write your name and index number in the spaces provide above
2. Answer **ALL** questions in the spaces provided in the question paper
3. Sign and write date of examination in the spaces provided.
4. You are **NOT** allowed to start working with the apparatus for the first **15** minutes of the 2¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
5. Mathematical tables and electronic calculators may be used
6. All working **MUST** be shown where necessary.

For Examiners use only

Question	Max. Score	Score
1	12	
2	13	
3	15	
Total score	40	

**This paper consist of 8 printed pages**

**Candidate should check the question paper to ensure that all the papers are printed as indicated and no questions are missing.**

1. You are provided with

- 10g of solid **A** which is a mixture of sodium carbonate and sodium chloride.
- 0.2 M HCl solution **B**

**You are required to**

- Determine the concentration of sodium carbonate in the mixture.
- Percentage of sodium chloride in the mixture.

**Procedure**

Transfer the entire solid into a 250 ml volumetric flask. Add about 100cm<sup>3</sup> of distilled water. Shake to dissolve. Top up with more distilled water to make up to the mark. Label this solution

**A2**. Using a pipette and a pipette filler, transfer 25 cm<sup>3</sup> of this solution into a conical flask.

Repeat the procedure two more times to complete table 1

**Table 1**

	<b>I</b>	<b>II</b>	<b>III</b>
final burette reading (cm <sup>3</sup> )			
initial burette reading (cm <sup>3</sup> )			
volume of solution B used (cm <sup>3</sup> )			

(a) Calculate

(i) The average volume of solution **B** used (1 mark)

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.....

(ii) The number of moles of HCl in the average titre (1 mark)

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.....

(b) Write an equation for the reaction (1 mark)

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(c) calculate the number of

(i) Moles of sodium carbonate in 25cm<sup>3</sup> of solution **A2** (1 mark)

.....  
.....  
.....

(ii) The moles of sodium carbonate in 250 cm<sup>3</sup> of solution A2 ( 1 mark)

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.....  
.....

(d) Determine the mass of sodium carbonate in solid A (1 mark)  
(Na=23, C = 12.0, H=1.0 , O= 16)

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.....  
.....

(e) Calculate the percentage of sodium chloride in solid A ( 1 mark)

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2. You are provided with

- Solution D, 2M HCl
- Solution C 2 M NaOH

You are required to determine the heat of neutralization

### Procedure

Wrap a plastic beaker with tissue paper and secure it with a rubber band.

Use a measuring cylinder to transfer 20cm<sup>3</sup> of solution C into a plastic beaker.

Take its initial temperature and record it in table 2 below.

Using a clean measuring cylinder, measure 5 cm<sup>3</sup> of solution B and add it to solution C. Stir the mixture immediately with a thermometer and record the highest temperature in table 2

Continue adding 5 cm<sup>3</sup> portions of solution every time record the highest temperature attained to complete the table

**Table 2**

Volume of D add cm <sup>3</sup>	0	5	10	15	20	25	30
Volume of A+D cm <sup>3</sup>	20	25	30	35	40	45	50
Temperature of mixture °C							

(4 marks)

Plot a graph of volume of solution D (X-axis) against highest temperature (3 marks)

(a) From the graph:

(i) Determine the volume of solution D that reacts completely with solution C. (1mark)

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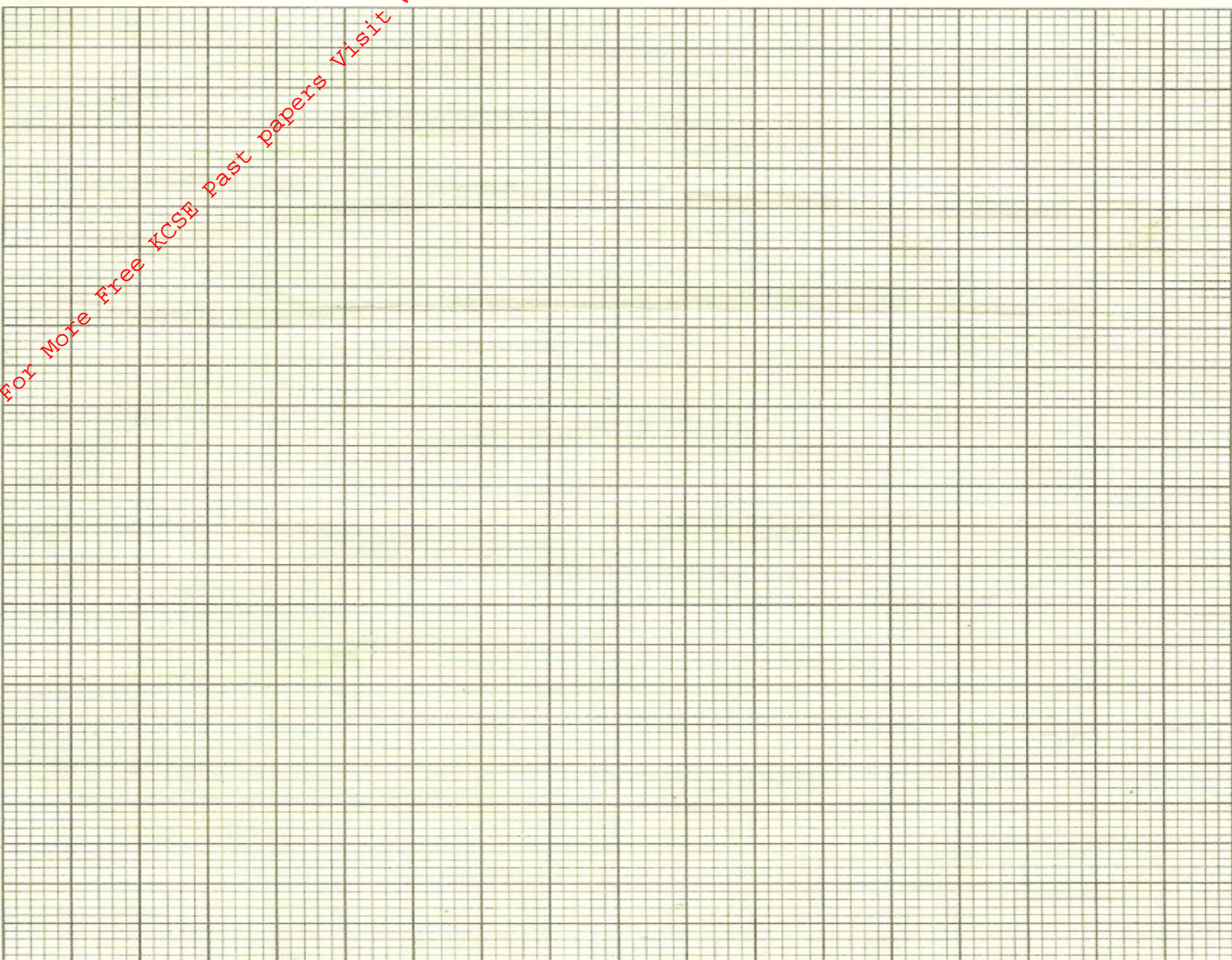
(ii) The highest temperature change

( 1 mark)

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(b) (i) Calculate the amount of heat evolved by the reaction (assume specific heat of capacity =  $4.2\text{Jg}^{-1}\text{K}^{-1}$ , density of solution =  $1\text{g/cm}^3$ ) ( 1 mark)

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(ii) Calculate the number of moles of HCl used ( 1 mark)

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(iii) Calculate the molar heat of neutralization of HCl ( 2 marks)

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3. (a) You are provided with solid **E**. Carry out the following tests and write your observations and inferences in the spaces provided.

(i) Place one third of solid **E** on a metallic spatula and ignite using a Bunsen burner flame

observation	Inferences
( 1 mark)	( 1 mark)

(ii) Place all the remaining solid in a boiling tube. Add 5cm<sup>3</sup> of distilled water. Shake to dissolve and divide it into 4 portions

(I) to the first portion add three drops of acidified potassium manganate (VII)

observation	Inferences
( 1 mark)	( 1 mark)

(II) To the second add three drops bromine water.

observation	Inferences
( 1 mark)	( 1 mark)

(III) To the third portion add all the sodium hydrogen carbonate provided

observation	Inferences
( 1 mark)	( 1 mark)

(b) You are provided with solid **F**. Carry out the tests below and record your observations and inferences in the spaces provided. Place all the solid **F** in a boiling tube. Add 10cm<sup>3</sup> of distilled water. Divide into four portions.

observation	Inferences
( ½ mark)	( ½ mark)

(i) To the first portion, add aqueous hydroxide drop wise until in excess.

observation	Inferences
( 1 mark)	( 1 mark)

(ii) To the second portion add 5 drops of barium nitrate solution, followed by 3 drops of dilute nitric acid.

observation	Inferences
( 1 mark)	( 1 mark)

(iii) To the third portion add 3 drops of acidified sodium dichromate (VI) solution

observation	Inferences
( 1 mark)	( 1 mark)