NAME:..... INDEX NO.....

SCHOOL..... CANDIDATE'S SIGN.....

DATE.....

233/3
CHEMISTRY
(PRACTICAL)
PAPER THREE
FORM FOUR
MARCH/APRIL 2013
TIME: 2 1/4 HOURS

WESTERN ZONE JOINT EXAMINATIONS (WEZOJE) - 2013

The Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- Answer all questions in the spaces provided on the question paper
- You are not allowed to start working with the apparatus for the first ¼ hour of the 2¼ hours allowed for this paper, this time is to enable you read through the question paper and make sure you have all the chemicals and the apparatus that you may need.
- Candidates are advised to record their observations as they are made
- Mathematical tables and electronic calculators may be used.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate's score
1	22	
2	8	
3	10	
Total	40	

1. You are provided with

– Sulpuhuric acid, solution **A**

– **0.5M** sodium hydroxide, solution **B**

– Zinc powder, Solid **C**

You are required to determine the **concentration** of Sulphuric acid in **moles per litre.**

Procedure I:

Measure 50cm^3 of solution A using a measuring cylinder and place it in a 100cm^3 plastic beaker. Stir solution gently with a thermometer and take its temperature after every thirty seconds. After 60 seconds add all of solid C at once and stir gently using the thermometer.

Record the temperature of the mixture after every 30 seconds.

RETAIN THE SOLUTION FOR USE IN PROCEDURE II.

Time (sec)	0	30	60	90	120	150	180	210	240	270	300	330
Temperature ^{0}C												

(3marks)

a) Plot a graph of temperature against time on the place provided. (5marks)

b) Using the graph, determine the highest change in temperature ΔT. (1mark)

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c) Calculate the heat change for the reaction given that the specific heat capacity for water is 42KJ/kg/K and that the density of resulting solution is 1g/cm^3. (1mark)

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d) Given that the molar heat of reaction of sulphuric acid with solid C is 232Kjmol^{-1}, Calculate the number of moles of Sulphuric acid that were used during the reaction. (1mark)

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Procedure II

Place all the solution obtained in procedure I in a clean 100cm^3 measuring cylinder. Add distilled water to make 100cm^3 solution. Transfer the solution into a beaker and shake well. Label the resulting solution as D. Fill the burette with solution B. Pipette 25.0cm^3 of solution D into a conical flask and add 2 – 3 drops of phenolphthalein indicator. Titrate solution B and record the results in the table below.

	I	II	III
Final burette reading (cm^3)			
Inital burette reading (cm^3)			
Volume of B used (cm^3)			

(4marks)

f) Determine the average volume of solution B used. (1mark)

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g) Calculate the number of moles of sodium hydroxide solution B used. (1mark)

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h) Determine:

i) The number of moles of Sulphuric acid in 25.0cm^3 of solution C. (1mark)

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ii) Number of moles of sulphuric acid in 100cm^3 of solution D. (2marks)

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iii) Using the results from (e) and (i) (ii) above calculate the total number of moles of Sulphuric acid in the 50cm^3 of solution A. (1mark)

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iv) Calculate the concentration of the original Sulphuric acid, solution A in moles per litre. (1mark)

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2. a) You are provided with a solid Y. carry out the tests that follow. Write your observations and inferences.

i) Place half a spatula of solid Y on a clean dry metallic spatula. Burn on the non- luminous part of the Bunsen burner flame.

Observations	Inferences
(1mark)	(1mark)

ii) Place the remaining solid Y in a boiling tube. Add about 10.0cm^3 of distilled water and shake well. Divide mixture into two portions.

Observations	Inferences
(1mark)	(1mark)

iii) Using the first portion, test for the pH of the solution using universal indicator.

Observations	Inferences
(1mark)	(1mark)

iv) To the second portion, add about 1.0cm^3 of acidified potassium chromate (VII) solution.

Observations	Inferences
(1mark)	(1mark)

3. You are provided with solid T. Carry out the experiments below. Write your observations and inferences in the spaces provided.

a) Place all of solid T in a boiling tube, add about 20cm^3 of distilled water and shake until all the solid dissolves, label this solution T. Use solution T for experiments listed below.

i) To about 2cm^3 off solution T, in the first test-tube add two drops of aqueous sodium sulphate.

Observations	Inferences
(1mark)	(1mark)

ii) To about 2cm^3 in the 2nd test tube add two drops of sodium chloride solution.

Observations	Inferences
(1mark)	(1mark)

iii) To about 2cm^3 in the 3rd test tube, add two drops of barium nitrate solution.

Observations	Inferences
(1mark)	(1mark)

iv) To the 4th portion, add two drops of Lead nitrate.

Observations	Inferences
(1mark)	(1mark)

v) To the 5th portion, add 5 drops of Sodium hydroxide solution. Add the piece fo aluminum foil provided to the mixture and shake. Warm the mixture and test any gas produced with blue and red litmus papers.

Observations	Inferences
(1mark)	(1mark)