Name ..... **Index Number** ..... / .....

Candidate's Signature

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233/3

Date

CHEMISTRY

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PAPER 3 (PRACTICAL)

JUNE/JULY 2013

TIME: $2^1/_4$ HOURS

KIKUYU DISTRICT INTERSCHOOLS EVALUATION

KENYA CERTIFICATE OF SECONDARY EDUCATION

233/3

CHEMISTRY

PAPER 3 (PRACTICAL)

TIME: $2^1/_4$ HOURS

INSTRUCTIONS TO CANDIDATES

(a) Answer **ALL** questions in the spaces provided in the question paper.

(b) You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $2^1/_4$ hrs 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.

(c) All working **must** be clearly shown where necessary.

(d) Mathematical tables and silent electronic calculators **may be** used.

For Examiner's use only

Questions	Maximum Score	Candidate's Score
1	10	
2	14	
3	16	
Total Score	40	

1. (a) Your are provided with

(i) Solution A was prepared by dissolving 10g of sodium hydrixide in 500cm^3 distilled water.

(ii) Solution B is sulphuric (VI) acid

You are expected to determine the concentration of sulphuric (VI) acid in moles per litre.

Procedure:

Fill the burette with solution B. Pipette 25cm^3 of solution A and transfer into the conical flask and add few drops of phenolphthalein indicator. Titrate solution A against soultion B and complete the table 1 below.

Table I

Titre	I	II	III
Final burette reading(cm^3)			
Initial burette reading(cm^3)			
Final burette reading(cm^3)			

(i) Determine the average volume of solution B used. Show your working. (1 mark)

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_____

(ii) Calculate the number of moles of sodium hydroxide used. (1 mark)

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_____

(iii) Calculate the number of moles of sulphuric (VI) acid used. (1 mark)

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(iv) Determine the concentration of sulphuric (VI) acid in moles per litre. (2 marks)

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(v) Determine the concentration of sulphuric (VI) acid in grammes per litre.
(s = 32, O = 16, H =) (1 mark)

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2. In this experiment you are expected to determine the molar heat of neutralization of sulphuric (VI) acid with 2M sodium hydroxide. Measure 20cm^3 of sulphuric (VI) acid, solution C and transfer into 100ml plastic beaker provided. Measure its temperature and record in the table below under 1st column. Take 5cm^3 of solution D and add to this solution, stir with the thermometer and record the final steady temperature. Consider to add 5cm^3 of D to the same solution and record the final steady temperatures until 40cm^3 of D has been added.

Table II

Volume of H_2SO_4, C used (cm^3)	20	20	20	20	20	20	20	20	20
Volume os 2M $NaOH_{(aq)}$ D, Added (cm^3)	0	5	10	15	20	25	30	35	40
Highest temperature reached (^{0}C)									

(i) On a graph paper, plot a graph of highest temperature reached (Y - axis) against volume of 2M $NaOH_{(aq)}$ added (X - axis) (3 marks)

(ii) From your graph determine the following:-

I Highest temperature (1 mark)

II. Volume of 2M $NaOH_{(aq)}$ needed to neutralize completely 20cm^3 of sulphuric (VI) acid. (1 mark)

(iii) Determine the number of moles of sulphuric (VI) acid used given that the solution contains 1 mole per litre of the acid. (2 marks)

(iv) Calculate the amount of heat evolved in the above reaction. (Take specific heat capacity of the solution to be 4.2J/gK and density of the solution to be 1g/cm^3) (2 marks)

(v) Hence determine the molar heat of neutralization of sulphuric (VI) acid. (2 marks)

2. (a) You are provided with solid F. Carry out the tests below and record your observations and inferences in the spaces provided.

(i) Place solid F in a boiling tube and add 8cm^3 of distilled water to dissolve the solid.

Observations	Inferences
1mark	1mark

(ii) To the first portion, add sodium hydroxide solution drop wise until in excess.

Observations	Inferences
1mark	1mark

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

Observations	Inferences
1mark	1mark

(iv) To the third, portion add few drops of barium chloride solution.

Observations	Inferences
1mark	1mark

(v) To the fourth portion, add few drops of dilute nitric (V) acid.

Observations	Inferences
1mark	1mark

(b) You are provided with solution E. Carry out the tests below and record your observations and inferences in th spaces provided.

(i) To the first portion, add a spatula of sodium carbonate provided.

Observations	Inferences
1mark	1mark

(ii) To the second portion, add few drops of acidified potassium manganate (VII) and warm.

Observations	Inferences
1mark	1mark

(iii) Place the third portion on a watch glass and ignite.

Observations	Inferences
1mark	1mark