Name: .... Index No. ....

School: .... Date: .... Candidate's Sign ....

233/3
CHEMISTRY
PAPER 3 (PRACTICAL)
FORM 4
MARCH / APRIL 2013
TIME: 2¹/₄ HOURS

BARINGO NORTH TRIAL EXAMINATIONS - 2013
The Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

1.   Write your name and index number in the spaces provided.
2.   Sign and write the date of examination in the spaces provided.
3.   Answer all the questions in the spaces provided.
4.   All working MUST be clearly shown where necessary
5.   Mathematical tables and silent electronics calculators may be used.

FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate Score
1	14	
2	13	
3	13	
TOTAL	**40**	

1. You are provided with solution A, 0.046 M of H_2SO_4. Solid D 2.50g of mixtures of Na_2SO_4 and Na_2CO_3 salts.

   You are required to determine the percentage of Na_2CO_3 in the mixture.

   Procedure

   Place all solid D into a 100cm³ beaker and add to this 100cm³ of distilled water. Stir until all the solid dissolves; label this solution as solution D. Transfer solution D into a volumetric flask and rinse the beaker with distilled water then pour the content to the volumetric flask and add water to 250 cm³ mark. Place A into burette. Pipette 25cm³ of solution D into a 250cm³ conical flask. Add 3 drops of methyl orange indicator and titrate with solution A. Record your results in the table below. Repeat the titration two more times to obtain concordant results and fill the table1.

   Table 1

	I	II	III
Final burette reading cm³			
Intial Burette reading cm³			
Volume of solution A over B			

   (4marks)

       ii) Calculate the average volume of solution A used   (1mark)

       iii) Write the possible equation of the overall reaction in this experiment.   (1mark)

   b) Calculate the moles of A in the titrated volume   (2marks)

   c)   i) Calculate the moles of B that react with A   (1mark)

       ii) Calculate the concentration of D in moles per dm³   (2marks)

   d) Work out the percentage of D in the mixtures that reacted with solution A.   (3marks)

2. You have been provided with the following
   - $70cm^3$ of solution B
   - 0.2M copper (ii) sulphate solution
   - 0.5g of zinc powder labeled solid E
   - Thermomenter ($0^0C - 110^0C$)
   - Stop clock / watch
   - $100cm^3$ plastic beaker

You are required to determine the molar enthalpy change of displacement of copper (ii) ions.

Procedure

Using the $100cm^3$ measuring cylinder, measure $50cm^3$ of solution B and transfer it into the $100cm^3$ plastic beaker. Measure the temperatures of the solution and record it after every a half a minute in the spaces provided below. At exactly 2 ½ minute carefully transfer the whole of solid E into the plastic beaker at once and stir the mixtures using the thermometer continuously and record the temperatures reading after every half a minute for the first five minutes in the table below.

Time minutes	0	½	1	1½	2	2½	3	3½	4	4½	5
Temperatures (^0C)											

a) Plot a graph of temperature (y-axis) against time. (3marks)
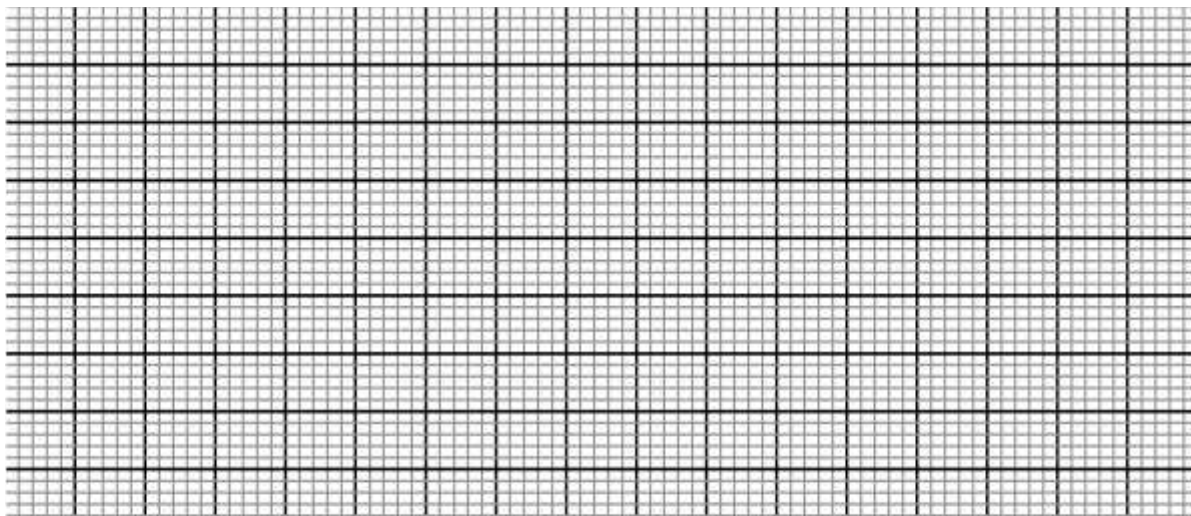
b) What is the temperature change? (1mark)

c) Write an ionic equation for reaction (1mark)

d) Calculate;
   i) The number of moles of copper (ii) ions in $50cm^3$ of solution (1mark)

   ii) Determine the enthalpy change of displacement of copper given that the density of solution is $1.0g / cm^3$ and specific heat capacity is $C = 4200J/kg/k$ (2marks)

   iii) Determine the molar enthalpy change of displacement. (1mark)

3.   You are provided with solid F. Carry out the test below and record your observations and inferences in the spaces provided.

Place all of solid F into a boiling tube. Add 10cm³ of distilled water and shake well. Use 2cm³ portions of the mixture for the following reactions.

i)   To a 2cm³ portion of the solution add a spatula of sodium hydrogen carbonate. Test any gases produced with both red and blue litmus papers.

Observation	Inferences
1mk	1mk

ii)   To the second portion add 3 drops of barium nitrate (retain the mixtures for use in test (iii) below)

Observation	Inferences
1mk	1½ mks

iii)   To the mixture obtained in (ii) above add about 5cm³ of 2M Nitric (v) acid.

Observation	Inferences
1mk	1mk

iv)   To the third portion add 2M sodium hydroxide drop wise till excess

Observation	Inferences
1mk	1½ mks

v)   To the forth portion add 2M aqueous ammonia dropwise till excess

Observation	Inferences
1mk	1mk

vi)   To the fifth portion add about 4cm³ sodium sulphate solution.

Observation	Inferences
1mk	1mk