Name……. **Index No**……/…….

School…… **Candidates Signature**……

Date…….

233/3
CHEMISTRY
Paper 3
(PRACTICAL
July/August 2013
TIME 2 HOURS

THE NAKURU DISTRICT TRIAL EXAMINATIONS - 2013

Kenya Certificate of Secondary Education (K.C.S.E)

233/1
CHEMISTRY
Paper 3
PRACTICAL
July/August 2013
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- All workings **MUST** be clearly shown where necessary.

1. You are provided with
   - Solution **A** containing 6.0 gl^{-1} of a dibasic acid $H_2C_2O4.XH_2O$
   - Solution **B** containing 4.0 gl^{-1} of sodium hydroxide
   - Phenolphthalein indicator

   You are required to determine the value of **x** in the dibasic acid $H_2C_2O_4.XH_2O$.

Procedure

- Place solution **A** in a burette. Using a pipette and pipette filler, measure 25.0cm^3 of solution B into a 250cm^3 conical flask.
- Add 2-3 drops of phenolphthalein indicator and titrate. Record your results in the table below. Repeat the titration two more times and complete the table.

	I	11	111
Final burette reading (cm3)			
Initial burette reading (cm3)			
Volume of solution A used (cm3)			

(4 marks)

What is the average volume of solution **A** used? (1mark)
(show clearly which values are being averaged)

Calculate the:-

(i) Calculate the molar concentration of sodium hydroxide solution **B** **(**1mark)

(ii) The acid is dibasic (contain two replaceable atoms per molecule of the acid). Calculate the molar concentration of the acid solution A (2marks)

(iii)Calculate the relative formula mass of $H_2\ C_2O_4 . XH_2O$. (H-1, C-12, 0-16) (1 mark)

(iv) What is the value of **x** in the formula $H_2\ C_2O_4 .XH_2O$ (2 marks)

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2. **You are provided with**

- Thermometer
- $100cm^3$ plastic beaker and tissue paper
- $50cm^3$ measuring cylinder
- Distilled water
- 4.0g of solid **Y** Potassium Nitrate crystals.
- You are required to determine the molar heat of solution ΔH solution of potassium nitrate

Procedure

- Measure $50cm^3$ distilled water and place it into a plastic beaker
- Record initial temperature T_1 of the water as shown below.
- Add 4.0 g of sold Y to the water and stir gently to dissolve all the solid. Record the final temperature of this solution T_2.

Final Temperature of water T_1 = ...

Initial temperature of solution T_2 = ...

Temperature change Δ T (k) = …… ……(2marks)

(a) Calculate the heat change for the reaction given, density of water = 1.0g/cm^3. Specific heat Capacity of water =4.2 j/g/k. (2 marks)

(b) Calculate the molar enthalpy of solution ΔH^{θ}_{soln}. of potassium nitrate (K=39, N=14, O=16) (2marks)

(c) Write a thermo chemical equation for the dissolution of potassium nitrate (1mark)

(d) Given that ΔH_{hydr} of potassium nitrate is -177.9Kj/mole. Calculate the ΔH_{latt} of potassium nitrate using the expression below

$\Delta H^{\theta}_{soln} = \Delta H^{\theta}_{latt} + \Delta H^{\theta}_{hydr}$

(e) Express this information on an energy level diagram (2 marks)

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3(a) You are provided with a solid Q. Carry out the tests below and record your observations and inferences in the spaces provided. Divide the solid into two halves.

(a) Place one half of solid Q in a clean dry test tube. Heat gently and then strongly. Test any gas provided with blue and red litmus paper.

Observation	Inferences
(2 marks)	1 mark

(b) (i) Place the other half into a boiling tube. Add about $10cm^3$ of distilled water and shake. Divide the resulting mixture into four portions

Observation	Inferences
(½ marks)	(½ mark)

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

Observation	Inferences
(1 marks)	(1 mark)

(iii) To the second portion add aqueous ammonia solution dropwise until in excess

Observation	Inferences
(1 marks)	1 mark

(iv)To the third portion, add about 3 drops of solution of Barium chloride

Observation	Inferences
(1 mark)	1 mark

(v) To the fourth portion, add about 3 drops of Lead (II) nitrate and warm.

observation	Inferences
(1 mark)	1 mark

3(b) You are provided with solid X. Carry out the tests below and record your observations and inferences in the spaces provided.

Place all the solid x into a boiling tube. Add $10cm^3$ of distilled water and shake well. Divide the mixture into 4 portions. Carry out the following tests.

(a) Test the first portion with both blue and red litmus paper.

observation	Inferences
(1 mark)	1 mark

(b) To the second portion add about 2 drops of acidified potassium magnate(VII) and shake well.

observation	Inferences
(1 mark)	1 mark

(c) To the third portion add 3 drops of bromine water.

observation	Inferences
(1 mark)	1 mark

(d) To the remaining portion add the piece of magnesium ribbon provided

observation	Inferences
(½ mark)	(½ mark