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

SCHOOL: ……………………………………………..SIGNATURE :………………………………

DATE: …………………………………………………

233/3

Chemistry

(Practical)

July/August 2016

Time: 2 Hours

KAKAMEGA SOUTH SUB-COUNTY JOINT EVALUATION TEST – 2016

Kenya Certificate of Secondary Examination (KCSE)

233/3

Chemistry

(Practical)

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. You are not allowed to work with apparatus for the first15 minutes of the 2 ¼ hours for this paper. This time is to enable you read the question paper and make sure you have all chemicals and apparatus that you need.
4. All workings MUST be clearly shown.
5. KNEC Mathematical tables and silent electronic calculators may be used.

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	19	
2	7	
3	14	
TOTAL	40	

This paper consists of 8 printed pages Check the Question paper to ensure that all pages are printed as indicated and no question are missing.

1. You are provided with:
   - Solution P. 0.2m Hydrochloric acid.
   - Solution Q sodium hydroxide solution
   - Solution R, Containing 49g/l of dibasic acid H_2A

You are required to:-

- Dilute Solution Q with distilled water.
- Standardize the diluted solution Q with solution P
- Determine the relative formula mass of A.

Procedure I

- Pipette 25 cm^3 of solution Q into a clean dry 250cm^3 volumetric flask.
- Measure 175 cm^3 of distilled water using a 100cm^3 measuring cylinder and add to solution Q in the flask.
- Shake well.
- Label this as solution S and keep it for further tests in procedure II.
- Pipette 25cm^3g solution S into a clean dry conical flask.
- Add 2 to 3 drops of phenolphaclein indicator and titrate with solution P.
- Record your results in the table I below.
- Repeat the procedure to obtain accurate results.

Table I (4mks)

	1	2	3
Final Burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution P used (cm^3)			

1. a) Determine the average volume of solution P used. (1mk)

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b) i) Find the number of moles of solution P used to react with 25cm^3 of the diluted solution S. (1mk)

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ii) Find the numbers of moles of solution S in 25 cm^3 of diluted solution. (1mk)

iii) Determine the number of moles of sodium hydroxide contained in the 1000 cm^3 g of ` solution S. (1mk)

c) Using your results in b (ii) above determine the concentration in moles per litre of the original sodium hydroxide solution Q (1mk)

Procedure II

- Pipette 25 cm^3 of the standardized solution into a clean dry conical flask.
- Empty your burette completely off solution P.

Now fill your burette with solution R and titrate with solution S in the conical flask containing 2 to 3 drops of phenolthalein indicator.

- Record your results in table II below.
- Repeat the procedure to obtain accurate results.

TABLE II	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution R used (cm^3)			

(4mks)

d) Determine the average volume of solution R used. (1mk)

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e) Determine the number of moles of sodium hydroxide in 25 cm^3 of solution S and hence the number of moles of solution R used. (2mks)

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f) Find the number of moles of solution R contained in one litre of solution. (1mk)

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g) Given that relative atomic mass of H= 1.0,

i) Find the relative formula mass of re dibasic acid. H_2A. (1mk)

ii) Determine the relative formula mass of A in the formula H_2A (1mk)

Q2. FA_1 is 3.5_g of a metal carbonate XCO_3 FA_2 is 2M HCl

The carbonate and acid react according to the following equation.

$$X\,CO_{3(s)} + 2\,HCl_{(l)(aq)} \longrightarrow XCl_{2\,(aq)} + H_2O_{(l)} + CO_{2(g)}$$

The enthalpy change. Δ H for this reaction is - 59.5 KJ mol $^{-1}$. Youre required to determine to determine the temperature rise when a known mass of one solid carbonate. CXO_3 is added to an excess of hydrochloric acid and use your results to calculate atomic mass R.A.M of the metal X.

Procedure.

Using the measuring cylinder provided add 50 cm^3 of hydrochloric acid FA_2 to 250 cm^3 plastic beaker.

- Measure the initial temperature of the acid FA_2 In the plastic beaker and record it in the table below.
- Empty all the carbonate provided FA_1 into the acid and stir gently with the thermometer.
- Record the maximum temperature attained when the solid has reacted with the acid in the table below.

Maximum temperature attained (^{0}c)	
Initial temperature of FA_2(^{0}C)	
Temperature change ΔH ^{0}C	

i) Using the temperature change from (a) above.

Calculate the enthalpy change for the reaction.

(Specific heat capacity of a solution = 4.2J/g/K, density of solution = 1g/cm^3 (2mks)

ii) Using your answer in (i) above and ΔH value for the reaction. Calculate the number of moles of FA_1 that reacted. (1mk)

iii) Using the mass of FA_1 given calculate the relative atomic mass RAM of metal X (C= 12.0, O= 16.0) (1mk)

Q3. You are provided with solid H. Carry out the tests below and write your observations and inferences in the spaces provided.

a) Place about half of solid H in a clean dry test tube. Heat the solid gently and then strongly. Test for any gas produced using both the red and blue litmus paper.

Observation	**Inferences**
(1mk)	(1mk)

b) Dissolve the remaining portion g solid H in about 8 cm^3 of distilled water contained in a boiling tube. Divide the solution into three portions.

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

Observation	**Inferences**
	(½ mk)

1 mk

ii To the second portion add two drops of concentrated nitric (v) acid then followed by aqueous sodium hydroxide dropwise until in excess.

Observation	**Inferences**
(1mk)	(1mk)

iii) To the third portion add 2-3 drops of barium chloride solution.

Observation	**Inferences**
(1mk)	(1mk)

iv) To the mixture obtained in (b iii) above add 2 cm^3 aqueous hydrochloride acid.

Observation	**Inferences**
($^1/_2$ mk)	($^1/_2$ mk)

C) You are provided with substance v. Carry out the following test and record your observation and inferences in the spaces provided.

i) Place about a half of substance V on metallic spatula and ignite it a Bunsen burner flame.

Observation	**Inferences**
(1mk)	(1mk)

ii) Place the remaining amount of substance V in a clean boiling tube add about 10 cm^3 of distilled water. Warm the mixture for about 10 seconds and divide it into two portions.

i) To the first portion add 2 to 3 drops of universal indicator.

Observation	**Inferences**
(1mk)	(1mk)

ii) To the second portion add 2 to 3 drops of acidic potassium manganate (VII).

Observation	**Inferences**
(1mk)	(1mk)