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

School: …………………………………………………………………. Candidate's Sign. ………..............

Date: ………………………………………..

233/3
CHEMISTRY
PAPER 3
JULY/AUGUST 2011
TIME: 2 ¼ HOURS

NDHIWA JOINT EVALUATION TEST

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

Chemistry
Practical

INSTRUCTIONS TO THE CANDIDATES:-

- ***Write your name and index number in the spaces provided***
- ***Sign*** *and write the* ***date*** *of examination in the spaces provided*
- ***Answer all the questions in the spaces provided.***
- *Mathematical tables and electronic calculators may be used.*
- *All working* ***MUST*** *be clearly shown where necessary.*
- *Use the first 15minutes of the 2 ¼ hours to ascertain you have all the chemical sand apparatus tha you may need.*

For Examiners use Only

QUESTION	MAX. SCORE	SCORE
1	13	
2	12	
3	15	
TOTAL	**40**	

This paper consists of 4 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. **You are provided with**
- 1.3g of solid K, sodium carbonate
- Hydrochloric acid solution L
- Phenolphthalein indicator
- methyl orange indicator
- you are required to standardize the hydrochloric acid solution L.

Procedure

Transfer all the solid K into a 250 cm^3 volumetric flask. Using 100 cm^3 measuring cylinder add 100 cm^3 of distilled water to solid K to dissolve it. Add more distilled water to the mark. Label this solution K. Using a pipette filler, pipette solution K into a conical flask. Add three drops of phenolphthalein indicator and titrate with solution L in the burette up to the end point.(do not pour out the contents of the conical flask). Record the reading in the table I. Add three drops of methyl orange indicator to the contents of the conical flask and continue titrating with solution L, up to the end point. Record the reading in table II. Repeat the procedure. Complete table I and II.

(a)

	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Titre (cm^3)			

(3½ mks)

Determine the average of the titre t_1

Table II (using methyl orange indicator) (3½ mks)

(b)

	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Titre (cm^3)			

Determine the average titre t_2

(c) Calculate the total volume of solution L.

$t_1 + t_2 =$

(d) Calculate the concentration of solution K in moles per litre. (Na=23, O=16, C=12) (2mks)

(e) Calculate the number of moles of sodium carbonate solution K in 25.0 cm^3 (1mk)

(f) Calculate the number of moles of hydrochloric acid solution L in the volume used. (1mk)

(g) Calculate the molarity of hydrochloric acid solution L. (1mk)

2. **You are provided with:**

- Solution B_1, potassium iodate solution
- Solution B2, acidified sodium hydrogen sulphite solution.
- A stop watch/stop clock
- Solution B3, starch indicator

You are required to find out the effect of the concentration of potassium iodate B_1 on the rate of reaction with acidified sodium hydrogen sulphite B2.

NB: The end point for the reaction of potassium iodate with acidified sodium hydrogen sulphite is detected by the formation of a blue coloured complex using starch indicator.

Procedure

(a) Place solution B1 in a burette and measure out the volumes of B_1 shown in table III into five dry test tubes. Using a 10 cm^3 measuring cylinder add distilled water to the test tubes as shown in **table III**

Test tube	Volume of B_1 and distilled water
1	10 of B_1 + 0 cm^3 distilled water
2	8cm^3 of B_1 + 2 cm^3 distilled water
3	7cm^3 of B_1 + 3 cm^3 distilled water
4	5cm^3 of B_1 + 5 cm^3 distilled water
5	4cm^3 of B_1 + 6 cm^3 distilled water

(b) Using a clean 10cm^3 measuring cylinder place 10cm^3 of B_2 into 100cm^3 beaker add 4cm^3 of solution B3 and shake well. To this mixture add quickly the contents of test tube 1 and start the stop watch/stop clock immediately. Shake the mixture and note the time taken (in seconds) for the blue colour to appear

Record the time in table IV

Repeat this procedure using the other solutions prepared in (a) above and complete table IV.

Volume of B_2 (cm^3)	Volume of B_3 (cm^3)	Volume of B_1 (cm^3)	Solid of distilled water	Time taken for blue colour to appear
10	4	10	0	
10	4	8	2	
10	4	7	3	
10	4	5	5	
10	4	4	6	

(c) On the grid below plot a graph of volume (vertical axis) of solution B1 used versus time (seconds) (3mks)

(d) From your graph determine the time taken for the blue colour to appear using a mixture of 6 cm^3 of solution B1 and 4cm^3 of distilled water. (1mk)

(e) How does the concentration of potassium Iodate B1 affects its rate of reaction with acidified sodium hydrogen sulphite B_2? Explain. (2mks)

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3. (a) Place all solid R provide into a clean boiling tube then add about 5 cm^3 of distilled water. Shake the contents thoroughly then filter. Retain both the filtrate and residue.

Observations	Inferences
1mk	1mk

(b) Divide the filtrate into four equal portion. To the first portion, add ammonia solution until in excess.

Observations	Inferences
½ mk	1mk

(c) To the second portion, add about 2 cm^3 of Barium Chloride Solutions.

Observations	Inferences
1mk	1mk

(d) To the third portion, add 2 or 3 drops of lead II nitrate solution provided followed by about 2 cm^3 of 2M nitric acid then shake the mixture.

Observations	Inferences
1mk	1mk

(e) To the fourth portion, add 3 drops of acidified potassium manganate VII.

Observations	Inferences
1mk	½ mk

(f)(i) Transfer all the residue into a clean boiling tube, then add about 2 cm^3 of 2M nitric acid add about 5 cm^3 of distilled water when all the solid has dissolved.

Observations	Inferences
½ mk	½ mk

(ii)Divide the resultant product obtained in f (i) above into three equal portions. Add sodium hydroxide solution drop wise until in excess.

Observations	Inferences
1mk	1mk

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

Observations	Inferences
1mk	1mk

(iii) To the third portion, add a few drops of potassium iodide solution.

Observations	Inferences
1mk	1mk