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

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

Date: …………………………...

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

RACHUONYO SOUTH DISTRICT 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	19	
2	10	
3	11	
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:**
   - Solution R – sodium thiosulphate containing 79g of the solute in 100cm3 of solution.
   - Solution S – hydrochloric acid.

   You are required to
   - Determine how rate of reaction between sodium thiosulphhate and hydrochloric acid varies with temperature.
   - Determine the concentration of hydrochloric acid solutions S

   Procedure.
   Using a measuring cylinder, transfer exactly 10cm3 of the solution R into a conical flask. Make a cross(x) on a white piece of paper and place the flask on the cross(x) on the paper.Using another clean measuring cylinder measure 10cm^3 of solution S and note its temperature; transfer the solution s into conical flask containing R and immediately start the stop watch. Swirl the mixture and record the time taken for the cross(x) to be blocked. Repeat the procedure at varying temperatures and fill the table below.

   Table I

Volume of R (cm^3)	10	10	10	10	10	10
Volume of S (cm^3)	10	10	10	10	10	10
Temperature of S (^{o}C)	25	30	40	50	60	70
Time taken for cross to be blocked (sec)						
Reciprocal of time $\dfrac{I}{Time}$ or $\dfrac{I}{t}$						

   a) Using the table above plot a graph of reciprical of time (y-axis) against temperature.   (3mks)
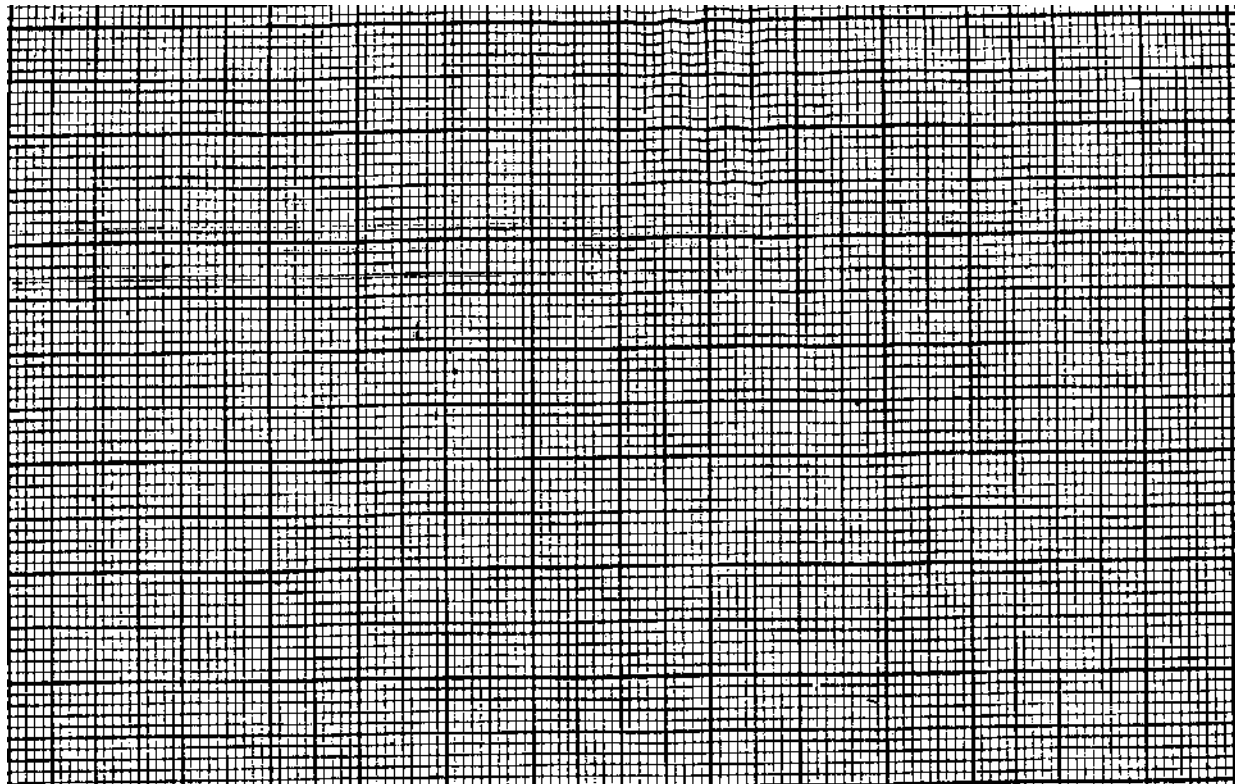
b) From the graph determine the time required for the reaction to be complete at 55°C.   (1mk)

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c) What will be the temperature for the reactions when time taken fro complete reaction in
15 seconds.   (1mk)

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d) How does the rate of reaction vary with varying temperature? Explain   (1mk)

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e) Given the equation for the reaction in the flask to be

$$Na_2S_2O_3 + 2HCl_{(aq)} \longrightarrow 2NaCl_{(aq)} + H_2O + S_{(s)} + SO_{2(g)}$$

(i) Calculate the moles of sodium thiosulphate that are in 10cm^3 of solution R   (1mk)

(ii) Workout the moles of hydrochloric that reacted with 10cm^3 of R   (1mk)

(iii) What is the concentration of the hydrochloric acid.   (1mk)

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2.   You are provided with
  ▪ solutions U and V
  ▪ solution U is acidified potassium, manganate (VII)
  ▪ Solution V was prepared by dissolving 4.18g of solid V in distilled water to make 250cm^3 of
    solution.

You are required to
Determine the number of moles on V that react with one mole of potassium Manganate(VII)

Procedure.
Place solution U in a burette. Pipette 25cm3 of solution V into a 250cm3 conical falsk. Titrate
solution V with solution U until a permanent pink colour just appears. Record your results in table II
below repeat the above procedure two more times.

Table II   (4mks)

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution U (cm^3)			

(a) Calculate the average volume of solution U used.   (1mks)

(b) Given that the concentration of solution U is 0.02M, Calculate the number of moles of potassium manganate (VII) used. (2mks)

(c) Determine concentration of solution V in moles per litre(relative formula mass of V is 278) (1mk)

(d) Determine the moles of V
(i) In 25.0cm^3 solution (1mk)

(ii) Which react with one mole of potassium manganate(VII) (1mk)

3.   You are provided with solid W. Cary out the tests below and record your observation and inferences in the spaced provided.
(a) Place ½ spatula end-full of W on a white tile and try to crush with you one fingure.

Observations	inference
(½ mk)	(½ mk)

(b) Place one spatula end-ful of W into a test tube, heat gently then strongly

Observations	inference
(2mks)	(1mk)

(c) Place ½ (half) spatula end –ful of W into a boiling tube, add 10cm3 of distilled water and shake well until all the solid dissolves and divide into 3 portions.
(i) To the 1st portion add, 0.2M sodium hydroxide dropwise till excess.

Observations	inference
(1mk)	(2mks)

(ii) To the 2nd portion, add 2 to 3 drops of 0.2M sulphuric acid.

Observations	inference
(1mk)	(1mk)

(iii) To the 3rd portion, add 4-5 drops of 0.2M lead (II) nitrate solution and heat to boiling

Observations	inference
(2mks)	(1mk)