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

School …………………………………………………………... Candidate's Signature ………………………

Date ……………….......................…………..

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY/ AUGUST
TIME: 2 HOURS

KITUI WEST DISTRICT JOINT EVALUATION TEST - 2011

Kenya Certificate of Secondary Education

233/3
CHEMISTRY
PAPER 3
PRACTICAL
TIME: 2 HOURS

INSTRUCTIONS:

- Answer **ALL** questions in the spaces provided.
- You are **NOT** allowed to start working with the apparatus for the first 15minutes of the 2– hours. Allowed for this paper. This time will enable you read through the question paper and make sure you have all the chemicals and apparatus required.
- Mathematical tables and electronic calculators may be used.
- All working **must be** clearly shown where necessary.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate's score
1	22	
2	12	
3	6	
TOTAL SCORE	40	

This paper consists of 6 printed pages.
Candidates should check to ensure that all pages are printed as indicated and no questions are missing

1. You are provided with:
   - Solution P of Potassium manganate (VII).
   - 0.05M solution Q of oxalic acid.
   - Solution R containing 4.9g of ammonium iron (II) Sulphate, $(NH_4)_2 SO_4.FeSO_4.6H_2O$, in $250cm^3$ of water.

   You are required to:

   i) Determine the rate of reaction between oxalic acid and Potassium manganate (VII).

   ii) Standardize the solution P.

PROCEDURE I:

Using a measuring cylinder, place 1 cm^3 of solution P into each of the five (5) test-tubes in a rack. Clean the measuring cylinder and use it to place 19 cm^3 of solution Q into a boiling tube. Prepare a water bath by placing about 200 cm^3 of water into a beaker and start to heat. Place a thermometer into solution Q and place it in the warm water until it attains a temperature of 40^0C. Remove the boiling tube from the water – bath and place it in the test-tube rack. Add the first portion of solution P immediately and at the same time start a stop watch. Record the time taken for solution P to be decolourised in table I below. Repeat the procedure at temperatures of 50^0C, 60^0C, 70^0C and 80^0C to complete the table.

Temperature of solution Q (^0C)	40	50	60	70	80
Time taken for decolourisation (tsecs)					
1/t sec^{-1}					

i) Plot a graph of 1/t against temperature (X-axis). (3marks)

ii) From the graph determine the time taken for the mixture to decolourise at 65^0C (3marks)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

iii) How does the rate of reaction between oxalic acid and Potassium manganate (VII) vary with temperature? (1mark)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

PROCEDURE II

Fill a burette with solution P. Pipette $25cm^3$ of solution R into a conical flask and titrate the solution P against solution R until a permanent pink colour just appears. Record your results in table II below and repeat the procedure to fill the table.

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

i) Determine the average volume of P used……………………..cm^3 (1mark)

(Show how you arrive at your answer)

ii) Calculate the concentration of solution R in moles per litre. (Fe=56, S=32, O=16, N=14, H=1).

(2marks)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

iii) Find the number of moles of solution R used (1mark)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

iv) Given the ionic equation for the reaction is

$$5Fe^{2+}(aq) + MnO_4^-(aq) + 8H^+(aq) \longrightarrow 5Fe^{3+}(aq) + Mn^{2+}(aq) + 4H_2O(l);$$

Find the number of moles of solution P used . (1mark)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

v) Determine the concentration of the Potassium manganate (VII), solution P in moles per litre. (2 marks)

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

2. You are provided with solid B. Carry out the tests below and record your observations and inferences in the table below

i) Place half a Spaluta full of solid B in a clean dry test-tube and heat gently then strongly.

Observations	Inferences
(1mark)	(1mark)

ii) Place the remaining solid B in a boiling tube and add about $5cm^3$ of distilled water and shake well. Divide the resulting mixture into four portions for the tests below.

Observations	Inferences
(1mark)	(1mark)

a) To the first portion add Sodium hydroxide solution dropwise until in excess.

Observations	Inferences
(1mark)	(1mark)

b) To the second portion add 2-3 drops of dilute Sulphuric (VI) acid

Observations	Inferences
(1mark)	(1mark)

c) To the third portion add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1mark)	(1mark)

d) To the fourth portion add 2-3 drops of barium nitrate solution

Observations	Inferences
(1mark)	(1mark)

3. You are provided with solid L. Carry out the tests below on L and record the observations and inferences in the spaces provide.
   a) Place half of solid L in a boiling tube and add about $5cm^3$ of distilled water. Divide the resulting mixture into two portions for the tests below:
   i) To the first portion add 2-3 drops of acidified Potassium manganate (VII).

Observations	Inferences
(1mark)	(1mark)

ii) To the second portion dip a piece of blue litmus paper

Observations	Inferences
(1mark)	(1mark)

b) Place the remaining solid L in a metallic spatula and ignite it.

Observations	Inferences
(1mark)	(1mark)