

NAME Adm No.

Date:

Candidate's Signature

233/3

CHEMISTRY

PAPER 3

JUNE 2016

TIME: 2¼ hours

THE 4MCK JOINT EXAMINATION

Kenya Certificate of Secondary Education (KCSE)

CHEMISTRY

Paper 3

Practical

INSTRUCTIONS TO CANDIDATES.

- Write your name and index number in the spaces provided above.
- Sign and write the date of exam in the spaces above.
- Answer **ALL** the questions in the spaces provided.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2¼ hours allowed time for the paper.
- Use the 15 minutes to read through the question paper and not the chemicals you require
- Mathematical tables and electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.

FOR EXAMINER'S USE ONLY.

Question	Maximum score	Candidate's score
1	21	
2	10	
3	09	
Total score	40	

1. You are provided with
 - i) Solution P; Acidified potassium Manganate (VII)
 - ii) Solution Q; 0.05M Oxalic acid
 - iii) Solution R containing 4.9g of $(\text{NH}_4)_2.\text{FeSO}_4.6\text{H}_2\text{O}$ in 250cm^3

You are required to

- i) Determine the rate of reaction between Oxalic acid and Potassium Manganate(VII)
- ii) Determine the concentration of substance P in moles per litre.

PROCEDURE 1

- a) Using a burette, place 2cm^3 of solution P into each of the five test tubes in a test tube rack. Using a 10ml measuring cylinder place 18cm^3 of solution Q into a boiling tube.

Insert a thermometer into solution Q and place it in warm water bath until it attains a temperature of 40°C . Remove the boiling tube and place it in a test tube rack. Add first portion of solution P and the same time start a stop watch. Record the time taken for solution P to decolourize and record in the table below. Repeat the experiment using 18cm^3 of solution Q at the temperatures 50°C , 60°C , 70°C and 80°C to complete the table below

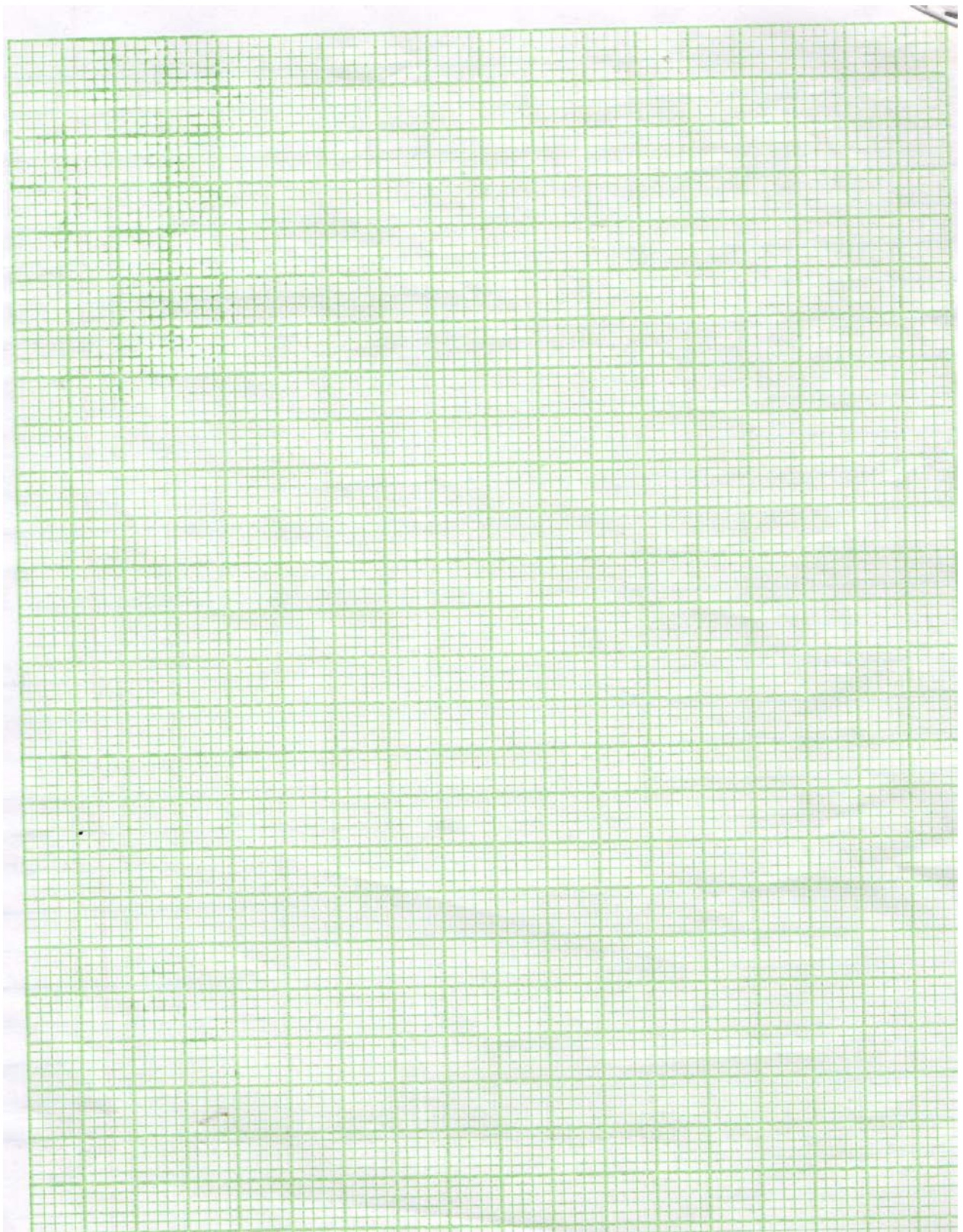
i)

Temperature of Solution Q($^\circ\text{C}$)	40	50	60	70	80
Time taken in seconds for solution P to decolourize					
$\frac{1}{t}$ (Rate)					

(5 marks)

Plot a graph of rate($\frac{1}{t}$) against temperature

(3 marks)



From the graph determine time taken for the mixture to decolorize at 65°C. (2 marks)

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- ii) How does the rate of reaction between Oxalic acid and potassium manganate(VII) vary with temperature. (1 mark)

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Procedure II

Fill the burette with solution P. Pipette 25cm³ of solution R into a conical flask. Titrate solution P against solution R until a permanent pink color just appears. Record your results in the table below. Repeat the procedure to complete the table.

- i)

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

(4 marks)

- ii) Determine the average volume of P used. (1 mark)

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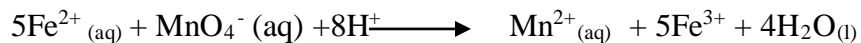
- iii) Determine the moles of solution R in 1 litre solution (R.M.M. of R = 392) (1 mark)

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iv) Calculate moles of solution R used in this experiment. (2 marks)

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v) Ionic equation for the reaction between Fe^{2+} and MnO_4^- ions is given below



i) Calculate mole of $\text{MnO}_4^{-}_{(\text{aq})}$ used in this reaction. (1 mark)

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ii) Determine the concentration of $\text{MnO}_4^{-}_{(\text{aq})}$ in moles per litre. (1 mark)

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

a) Place half spatula solid B in a clean dry test tube and heat gently to strongly

Observations	Inferences
(1 mark)	(1 mark)

b) Place the remaining solid B in a boiling tube and add 10cm³ of distilled water. Shake well until the solid dissolve. Divide the solution into four portions.

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

Observations	Inferences
(1 mark)	(1 mark)

ii) To the second portion add 3 drops of sulphuric acid

Observations	Inferences
(1 mark)	(1 mark)

iii) To the third portion add ammonia solution drop wise until in excess

Observation	Inferences
(1 mark)	(1 mark)

iv) To the 4th portion add 3 drops of Barium Nitrate solution

Observation	Inferences
(1 mark)	(1 mark)

Q3 You are provided with an organic solid L. Use it to carry out tests below. Record your observations and inferences in the spaces provided.

a) Scoop $\frac{1}{4}$ spatula-ful of the solid and ignite it.

Observation	Inferences
(1 mark)	(1 mark)

b) i. Put the remaining solid into a clean boiling tube and add 10cm³ of distilled water and shake well. Divide the resulting solution into 3 portions.

Observations	Inferences
($\frac{1}{2}$ mark)	($\frac{1}{2}$ mark)

ii. To the first portion add a spatula full of sodium hydrogen carbonate

Observation	Inferences
(1 mark)	(1 mark)

iii. To the second portion add 2 drops of potassium manganate(VII)

Observation	Inferences
(1 mark)	(1 mark)

iv. To the third portion add 2 drops of bromine water

Observations	Inferences
(1 mark)	(1 mark)

