

MUTITO SUB-COUNTY KCSE REVISION MOCK EXAMS 2015

233/3
CHEMISTRY
PAPER 3
(PRACTICAL)
TIME: $2\frac{1}{4}$ HOURS

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NAME _____
SCHOOL _____

INDEX NO. _____
SIGNATURE _____
DATE _____

233/3

CHEMISTRY

PAPER 3

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MUTITO SUB-COUNTY FORM FOUR JOINT EVALUATION TEST, 2015

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

233/3

CHEMISTRY

PAPER 3

(PRACTICAL)

TIME: $2\frac{1}{4}$ HOURS

INSTRUCTIONS

- Write your name, school and index number in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $2\frac{1}{4}$ 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.
- Candidates may be penalized for not following the instructions in this paper.

FOR EXAMINER'S USE ONLY

Question		Maximum score	Candidate's score
1	A	19	
	B	07	
2	A	08	
	B	06	
Total score		40	

This paper consists of 8 printed pages

Candidates should check to ensure that all pages are printed as indicated and no questions are missing

1. A) You are provided with:

- Solution D₁ ethanoic acid
- Solution D₂ aqueous potassium permanganate (VII)
- Solution D₃ 0.1M Ammonium iron (II) sulphate
- 1M sulphuric acid

You are required to:

- Standardize D₂ and D₃
- Determine the solubility of D₁ at room temperature.

Procedure I

Fill the burette with solution D₂. Pipette 25cm³ of D₃ into a conical flask. Add 2.0cm³ of 1M sulphuric acid using a measuring cylinder. Titrate solution D₃ with solution D₂ until a permanent pink colour just appears. Repeat the procedure and complete the table A below.

Table A

(4 marks)

Experiment	I	II	III
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of D ₂ used (cm ³)			

a) Calculate the average volume of D₂ used.

(1 mark)

b) Given $\text{MnO}^-_{(\text{aq})} + 5\text{Fe}^{2+}_{(\text{aq})} + 8\text{H}^+_{(\text{aq})} \rightarrow \text{Mn}^{2+}_{(\text{aq})} + 5\text{Fe}^{3+}_{(\text{aq})} + 4\text{H}_2\text{O}_{(\text{l})}$

i) Calculate the number of moles of D₃ used.

(1 mark)

ii) Calculate the number of moles of D_2 used.

(1 mark)

iii) Calculate the number of moles of D_2 per litre.

(1 mark)

Procedure II

Measure 25cm^3 of solution D_1 . Pour it into a conical flask and dilute it by adding 75cm^3 of distilled water, label the solution D_4 . Fill the burette with D_2 . Pipette D_4 into a conical flask. Add 2.0cm^3 of 1M sulphuric acid using a measuring cylinder. Heat the solution to about 70°C and titrate while hot with D_2 until a permanent pink colour just appears. Record your results in table B below. Repeat the procedure to fill the table.

Table B

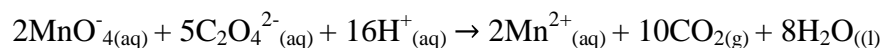
(4 marks)

Experiment	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of D_2 used (cm^3)			

c) i) Calculate the average volume of D_2 used

(1 mark)

ii) Given the reaction between manganese (VII) ions and ethanedioate is



Calculate the number of moles of MnO_4^- ions in the average volume of D_2 used. (1 mark)

iii) Calculate number of moles of ethanedioate ions in 25cm^3 of solution D_4 . (1 mark)

iv) Calculate number of moles of ethanedioate ions in 100cm^3 of solution D_4 (1 mark)

v) How many moles of ethanedioate ions were in 25cm^3 of solution D_1 used (1 mark)

vi) Given molecular formula of ethanedioic is $\text{H}_2\text{C}_2\text{O}_4$. Calculate its solubility in grams per 100g of water at room temperature. (2 marks)

B) You are required to find out the effect of concentration of solution D₂ on rate of reaction.

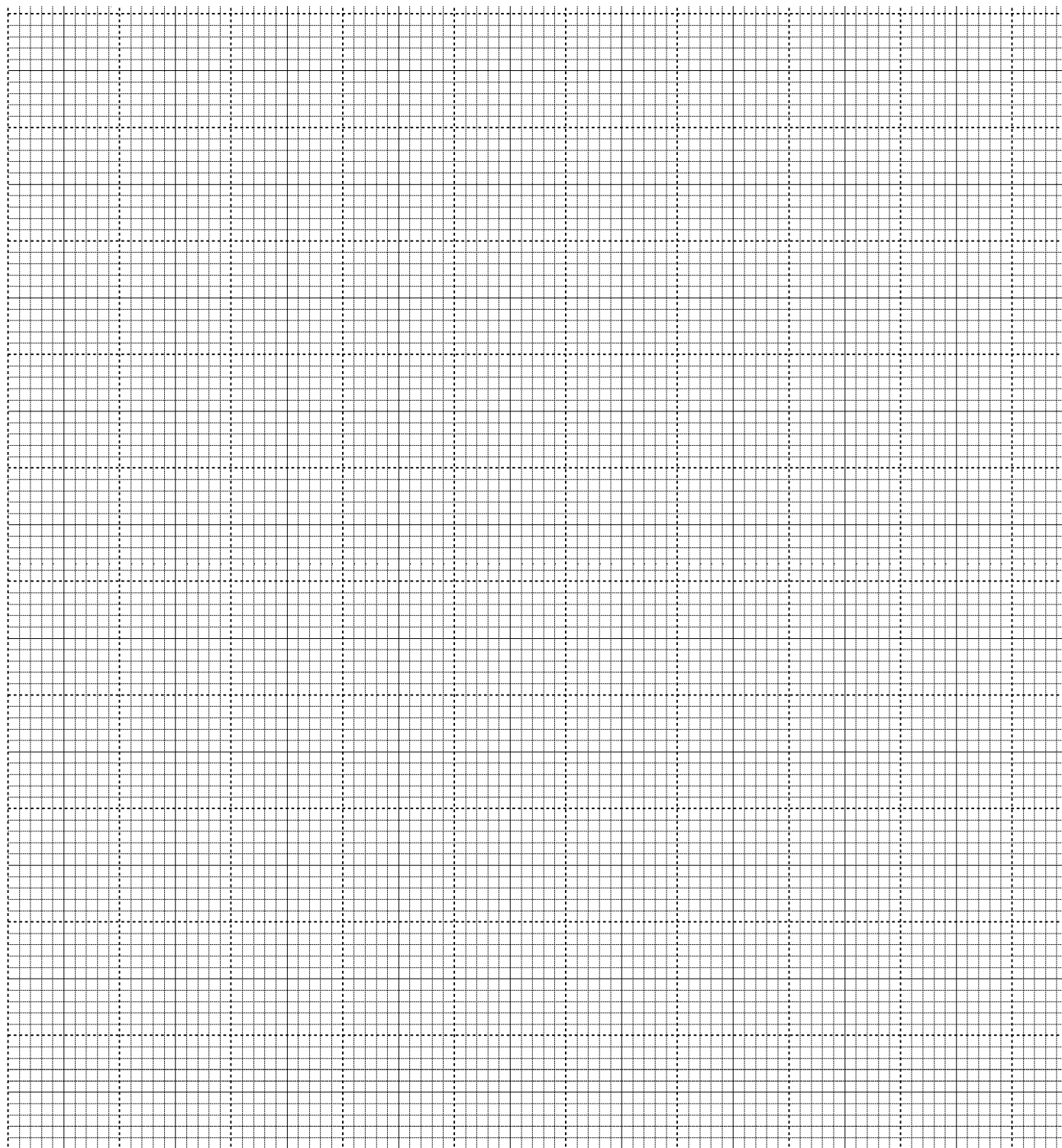
Procedure II

Using a burette, place 5cm³ of solution D₂ into a boiling tube. To this solution add 5cm³ of solution D₁ using a measuring cylinder and immediately start a stopwatch. Shake the mixture and place the boiling tube on a test tube rack. Note and record time taken for the purple colour of mixture to disappear. Repeat the procedure using volumes of solution D₂ and distilled water as indicated in table III below. (4 marks)

Volume of D ₂ in cm ³	Volume of water added in cm ³	Volume of D ₁ in cm ³	Concentration of D ₂ in moles/cm ³	Time for colour change in seconds
5.0	0.0	5.0		
4.0	1.0	5.0		
3.0	2.0	5.0		
2.0	3.0	5.0		
1.0	4.0	5.0		

Use the results to plot a graph of concentration in moles per litre of D_2 used against time taken for colour change.

(3 marks)



2. A) You are provided with solid P. carry out the tests below and record your observations and inferences in the spaces provided.

Test for any gases produced.

- a) Put half spatula endful of solid P into a test-tube, heat gently and then strongly.

Observations	Inferences
(1 mark)	(1 mark)

- b) Put the remaining solid P into a test-tube, add about 5cm^3 of distilled water and shake thoroughly and divide it into three portions.

- i) To the first portion add ammonium hydroxide solution dropwise till in excess.

Observations	Inferences
(1 mark)	(1 mark)

- ii) To the second portion add about 2cm^3 of barium nitrate solution followed by about 1cm^3 of dilute nitric acid.

Observations	Inferences
(1 mark)	(1 mark)

- iii) To the third portion add 1cm^3 of sodium chloride solution. Heat the product formed and allow it to cool.

Observations	Inferences
(1 mark)	(1 mark)

- B)** You are provided with 2cm^3 of liquid Q.

- a) Dip 2cm long strip of paper into the fluid and hold the strip of paper against a flame.

Observations	Inferences
(1 mark)	(1 mark)

- b) Divide liquid Q into two portions.

- i) To the first portion add 2-3 drops of bromine water.

Observations	Inferences
(1 mark)	(1 mark)

- ii) To the second portion add 2-3 drops of acidified potassium manganate (VII) solution.

Observations	Inferences
(1 mark)	(1 mark)