

NAME.....INDEX NUMBER.....

SIGNATURE.....

P525/3  
CHEMISTRY  
PRACTICAL  
PPAPER 3  
JULY/AUGUST 2023  
3:15 hours

**KANUNGU DISTRICT JOINT MOCK EXAMINATIONS**  
**UGANDA ADVANCED CERTIFICATE OF EDUCATION**  
**CHEMISTRY PRACTICAL**  
**PAPER 3**  
**3 hours 15minutes**

**INSTRUCTIONS:**

*Answer all questions*

*Record your answer on this question paper in the spaces provided*

*Mathematical tables and silent non-programmable calculators may be used*

*Reference books i.e. text books on qualitative analysis etc. should not be used*

*Candidates are not allowed to start working with apparatus for the first 15minutes. This time is to enable candidates to read the question paper and make sure they have all the apparatus and chemicals that they may need.*

FOR EXAMINER'S USE ONLY			
Q1	Q2	Q3	Total

1. You are provided with the following;

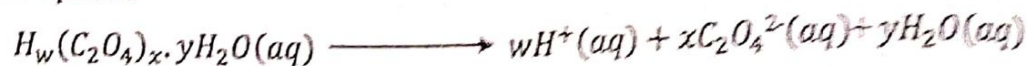
FA1, which contains 2.8g of sodium hydroxide per litre.

FA2, which is 0.02 M potassium manganate (v) solution.

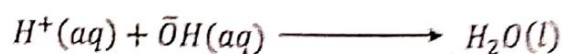
FA4, which is 2M sulphuric acid.

Solid P, which is an acidic component of the formula  $H_w(C_2O_4)_x \cdot yH_2O$ .

You are required to determine the values of  $w$ ,  $x$ , and  $y$ . Solid P dissolves in water according to the equation.



The hydrogen ions react with the hydroxide ions from sodium hydroxide according to the equation.



Also, acidified manganate (VII) ions from potassium manganate (VII) reacts with oxalate ions according to the equation.



#### Procedure 1.

Weigh accurately 1.0g of solid P into a clean beaker. Add 100cm<sup>3</sup> of distilled water using a measuring cylinder.

Transfer the solution into a 250cm<sup>3</sup> volumetric flask and make up to the mark with distilled water. Label the solution FA3.

Pipette 20 or 25cm<sup>3</sup> of FA3 into a clean conical flask. Add 2-3 drops of phenolphthalein indicator and titrate with FA1 from the burette until the end point is reached.

Repeat the titration until you obtain consistent results.

Record your results in a table below.

#### RESULTS

Mass of beaker + P = ..... g (1 mark)

Mass of beaker = ..... g (1 mark)

Mass of P = ..... g (1 mark)

Volume of pipette used = ..... cm<sup>3</sup> (1 mark)

TABLE 1 (4 marks)

Final burette reading (cm <sup>3</sup> )				
Initial burette reading (cm <sup>3</sup> )				
Volume of FA1 used (cm <sup>3</sup> )				

Values used to calculate average volume

(1 mark)

Average volume of FA1 (02½mark)

.....

.....

.....

**Procedure II**

Pipette 20 or 25cm<sup>3</sup> of FA3 in a Conical flask.

Add an equal volume of FA4 and heat the mixture to 70°C. Titrate the hot solution immediately with FA1 from the burette.

Repeat the titration until you get consistent results.

Record your results in table II below.

(04½marks)

**TABLE II**

Final burette readings(cm <sup>3</sup> )			
Initial burette readings(cm <sup>3</sup> )			
Volume of FA1 used(cm <sup>3</sup> )			

Values of FA1 used to calculate average volume.

(½mark)

.....

.....(cm<sup>3</sup>)

Average volume of FA1 used

(02½mark)

.....

.....

.....(cm<sup>3</sup>)

**Questions**

a) Calculate the Concentration of,

i). H<sup>+</sup> in FA3 in moles per litre

(05½mark)

.....

.....

.....

.....

.....

.....

.....

.....



ii)  $C^{2-}O_4^{2-}$  in  $FA_3$  in moles per litre

(06marks)

b). Determine the;

i). Ratio of w to x

ii). Value of y in  $H_w(C_2O_4)_x \cdot yH_2O$

2. You are provided with an inorganic compound K that contains two cations and two anions. Carry out the following tests and identity the ions present and any gases, which may be evolved. Write your observations and deductions in the table below.

**TABLE III**

Test	observations	Deductions
a). Heat a spatula end full of K in a dry test tube until there is no further change		
b). To a spatula end full of K add three drops of sulphuric acid and warm gently.		

<p>c). To two spatula end full of K in a boiling tube add 5cm<sup>3</sup> of water and shake well to dissolve</p> <p>To the resultant solution add dilute sodium hydroxide solution dropwise until excess and then filter. Keep both the filtrate and the residue. To the filtrate add dilute nitric acid dropwise until the solution is just acidic and divide the acidic solution into seven parts.</p>		
<p>(i). To the first part add dilute sodium hydroxide solution dropwise until in excess.</p>		
<p>(ii). To the second part add dilute ammonia solution dropwise until in excess.</p>		
<p>(iii) To the third part, add 3-4 drops of potassium iodide solution.</p>		
<p>(iv). To the fourth part carry out a test of your own choice to confirm one of the cations contained in K.</p>		



(v). To the fifth part, add barium nitrate solution.		
(vii). To the sixth part, add 2-3 drops of silver nitrate solution followed by dilute ammonia solution until in excess.		
(vii). To the seventh part, add one drop of dilute nitric acid followed by one drop of bleaching agent and then 2-3 drops trichloromethane and then shake gently.		
(d). Wash the residue obtained in (c) above with dilute sodium hydroxide solution and then dissolve the washed residue in dilute sulphuric acid. Divide the resultant solution into four parts.		
(i) To the first part, add dilute sodium hydroxide solution dropwise until in excess.		
(ii). To the second part, add dilute ammonia solution dropwise until in excess.		

(iii). To the third part add 2-3 drops of potassium chromate solution		
To the fourth part carryout a test of your own choice to confirm the second cation in K		

(e). Identify the;

(i). Cations in

K .....and.....

(ii). Anions in

K .....and .....

3. You are provided with an organic compound M. Carry out the following tests and comment on the nature of M.

Test	Observation	Deductions
(a). Burn a small amount of M on a spatula end or crucible lid.		
(b). Shake two spatula ends full of M with about 8cm <sup>3</sup> of ethanol. Test the resultant solution with a litmus paper		
(c). Divide the resultant solution into three parts. (i). To the first part add sodium hydrogen sulphite solution.		



(ii). To the second part add neutral iron(ii)chloride solution		
(iii). To the third part add iron(ii)chloride solution.		
(d). To a spatula end full of M in a test tube, add 2cm <sup>3</sup> of sodium hydroxide solution and warm to dissolve. Cool the resultant solution and divide the resultant solution into two parts		
(i). To the first part add neutral iron(ii)chloride solution and heat.		
(ii)to the second part, add dilute hydrochloric acid		
(e). Carry out a test of your choice to determine the functional group of the organic substance M ..... ..... ..... ..... ..... .....		

(f) Comment on the nature of M.

.....  
.....END

**KANUNGU DISTRICT JOINT MOCK EXAMINATIONS**  
**UGANDA ADVANCED CERTIFICATE OF EDUCATION**  
**PRACTICAL CHEMISTRY INSTRUCTIONS**  
(PAPER P525/3)

**CONFIDENTIAL**

Great care should be taken that the information given below doesn't reach the candidates either directly or indirectly.

**NB:** The subject head / head of department must ensure that the teacher responsible for preparing the apparatus hands in his / her trial results properly sealed in a separate envelope and firmly fastened / attached to candidates scripts envelope(s).

1. The description of the reagents and chemicals specified below does not necessarily correspond with the description in the question paper. Candidates must not be informed of the differences.
2. Candidates are not allowed to use reference books (i.e text books, booklet on qualitative analysis etc) during the examinations.
3. In addition to fittings and substances ordinarily contained in a chemistry laboratory, each candidate will require;

- 1 Burette 50cm <sup>3</sup>	- 100cm <sup>3</sup> of FA <sub>4</sub>
- 1 Pipette 25cm <sup>3</sup> (or 20cm <sup>3</sup> )	- 1.3g of P
- 1 Volumetric flask (250cm <sup>3</sup> )	- Phenolphthalein indicator and methyl orange indicator
- 2 conical flasks	- 2 measuring cylinders (100cm <sup>3</sup> )
- 1 filter paper	- 2.6g of K
- 4 Beakers (250cm <sup>3</sup> )	- 3g of M
- 8 test tubes	- 8cm <sup>3</sup> of ethanol
- 100cm <sup>3</sup> of FA <sub>1</sub>	
- 100cm <sup>3</sup> of FA <sub>2</sub>	

**Easy access to:**

- Heat source
- Weighing balance reading to at least one decimal point.
- Reagents for identifying cations anions and organic compounds.
- FA<sub>1</sub> is prepared by dissolving 2.8g of sodium hydroxide to make one litre of solution
- FA<sub>2</sub> is prepared by dissolving 3.16g of potassium manganate (VII) per litre
- K is prepared by mixing Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> · 6H<sub>2</sub>O, MgSO<sub>4</sub> · 7H<sub>2</sub>O and KI in the ratio of 1:1:0.5 respectively.
- M is Benzoic acid
- P- Ethanedioic acid

©2023 Kanungu District Joint Mock Examinations