Name……class……

P525/ 3
Chemistry
(Practical)
Paper 3
Feb /Mar, 2022
3 ¼ hours.

S.6 MOT I EXAMINATIONS – 2022
CHEMISTRY PRACTICAL
PAPER 3
TIME: 3 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

*Answer **all** questions*

Record your answers in this question paper in the spaces provided.

You are not allowed to use any reference book

Mathematical tables, slide rulers and silent non-programmable electronic calculators may be used.

Candidates are not allowed to start working with the apparatus for the first 15 minutes. This time is to ensure that they have all the chemicals and apparatus they need.

For Examiner's Use Only			
Q1	*Q2*	*Q3*	*TOTAL*

Question one

You are provided with the following:
FA1; which is approximately 0.02 M potassium manganate(VII) solution.
FA2; which is a mixture containing oxalic acid and 3.35g of an oxalate, per litre solution.
FA3; which is 0.04M sodiumhydroxide solution.
Solid **Q** which is ferrous ammonia sulphate hexahydrate, .
You are required;
To determine the molar concentration of the potassium manganate (VII) solution
To determine the relative atomic mass of the element presented by in the oxalate by titration.

Procedure A

Weigh accurately 4.9g of **Q**, transfer it into a beaker and add about 50 of distilled water to dissolve. Transfer the resultant solution into a 250 volumetric flask and make to mark with more distilled water. Label the resultant solution **FA4**.
Pipette 25.0 or 20.0 of **FA4**, add an equal volume of 2M sulphuric acid and titrate the resultant solution with FA1 from the burette. Repeat the titration until you get consistent results. Record your results in Table I below.

Table I

Volume of pipette used……

Experimental run	1	2	3
Final burette reading(			
Initial burette reading(			
Volume of **FA1** used()			

Titre values used to calculate the average volume of **FA1**used : …… , ……..

Average volume of **FA1** used
……
……

Procedure B

Pipette 25.0 or 20.0 of **FA2** and titrate the resultant solution with **FA3** from the burette using phenolphthalein indicator. Repeat the titration until you get consistent results. Record your results in the Table II below.

Table II

Volume of pipette used……

Experimental number	1	2	3
Final burette reading(			
Initial burette reading(			
Volume of **FA3** used()			

Titre values used to calculate the average volume of **FA3** used : …… , ……..

Average volume of **FA3** used

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Procedure C

Pipette 25.0 or 20.0 of **FA2**, add an equal volume of 2M sulphuric acid. Heat the mixture to 70 and titrate the hot solution with **FA1** from the burette. Repeat the titration until you get consistent results. Record your results in Table III below.

Table III

Volume of pipette used……

Experimental number	1	2	3
Final burette reading(			
Initial burette reading(			
Volume of **FA1** used()			

(a)

(i) Titre values used to calculate the average volume of **FA1**used: …… , ……..

(ii) Average volume of **FA1** used

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……

(iii) Write an equation for the reaction between;

Manganate (VII) ions and iron (II) ions in acidic medium.

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Manganate (VII) ions and oxalate ions in acidic medium.

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(b) Calculate the;

(i) Concentration of solution **FA1** in .

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(ii) Molar concentration of oxalate ions in **FA2**.

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(iii) The relative atomic mass of the element represented by Z. (07marks)

Question two

You are provided with substance P which contains two cations and two anions.
You are required to carry out the following tests and identify the cations and anions in P, identify any gases that may be evolved.

(29marks)

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat a spatula endful of P in a dry test tube strongly until in excess.		

(b) To a spatula endful of P in a boiling tube add dilute nitric acid until the solid just dissolves. Then add sodium hydroxide dropwise until in excess. Filter. Wash the residue and keep it for test(d). Keep the filtrate for test (c).		
(c) To the filtrate add dilute nitric acid until the solution is just acidic. Divide the acidic solution into five portions.		
(i) To the first portion add sodium hydroxide solution drop wise until in excess.		
(ii) To the second portion of the acidic solution add ammonia solution dropwise until in excess.		
(iii) Carry out a test of your choice to confirm the cation in the filtrate …… …… …… ……		
(iv) To the fourth portion add lead (II) nitrate solution		
(v) Carry out a test of your choice to confirm the anion in the filtrate. …… …… ……		
(d) To the residue in a test tube add dilute hydrochloric acid. Until it just dissolves. Divide the solution into four portions.		
(i) To the first portion add sodium hydroxide solution until in excess.		
(ii) To the second portion add ammonia solution until in excess.		

(iii) Carry out a test of your choice to confirm the cation in the residue. …….. …….. ……		

The cations in P are…… and ……..
The anions in P are …… and ……..

Question three

You are provided with substance **K** which is an organic compound. You are required to determine the functional group and comment on the nature of substance **K.**
Carry out the following tests on k and record your observation and deductions in the table below. Identify any gas (es) evolved.

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Burn a small amount of K on a spatula end/ a porcelains dish.		
(b) To about 3 of k in a test tube, add about 2of water and shake. Test with litmus paper. Divide the resultant mixture into 6 portions.		
(i) To the first portion, add 3-4 drops of sodium carbonate solution.		
(ii) To the second portion, add 3-4 drops of neutral iron (III) chloride solution.		
(iii) To the third portion, add 2-3 drops of Brady's reagent.		
(iv) To the forth portion, add 2-3cm^3 of acidified potassium permanganate solution and heat. Divide the resultant mixture into two portions		
To the first portion, add 3-4of Brady's reagent.		

To the second portion, add Tollen's reagent and warm.		
(v) To the fifth portion of the solution from (b), add 2-3 drops of concentrated sulphuric acid followed by 1cm^3 of ethanoic acid and heat. Allow to cool.		
(vi) To the sixth portion, add iodine solution drop wise until in excess and then add dilute sodium hydroxide solution drop wise until the brown color of iodine just disappears then warm and allow to cool.		

Comment on the nature of K.

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THE END