

NameIndex No.....

P525/3
Chemistry
Practical
June 2014

UACE MOCK EXAMINATIONS 2014

CHEMISTRY PRACTICAL

PAPER 3

TIME: 3 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

- All questions are compulsory
- Record your answers on this question paper in the spaces provided only
- Candidates are not allowed to start work with the apparatus for the first 15 minutes. This time is to enable candidates to read the question paper and make sure they have all the apparatus and chemicals they may need.

FOR EXAMINER'S USE ONLY		
QUESTION	MARKS	
Q.1		
Q.2		
Q.3		
TOTAL		

1. You are provided with the following;

DA1 which is a solution containing 5.6g l^{-1} of iron (II) ions.

DA2 which is a solution of potassium manganate (VII) of unknown concentration

Solid Q.

1M sulphuric acid solution.

You are required to determine;

- (i) **the molar concentration of potassium manganate (VII) in DA2**
- (ii) **the stoichiometric ratio of reaction between iron (II) ions and Q**

Procedure

Part A

- (a) Pipette 25cm^3 (or 20cm^3) of DA1 into a clean conical flask, then add 20cm^3 of 1M sulphuric acid and titrate with solution DA2 from the burette until the end point. Repeat the titration 2 – 3 times until you obtain consistent results. Enter your results in the table below

Volume of pipette used = cm^3

Titration number	1	2	3
Final burette reading/ cm^3			
Initial burette reading/ cm^3			
Volume of DA2 used/ cm^3			

Titre values for calculating average volume of DA2

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Average volume of DA2..... cm^3

Questions

- (b) Calculate the molar concentration of manganate (VII) ions in DA2 (Fe = 56)

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PART B:

- (c) Weigh accurately about 0.5g of solid Q and place it in a beaker. Add to it about 50cm³ of water and stir to dissolve. Transfer the contents of a beaker into a 250cm³ volumetric flask. Add exactly 150cm³ of DA1 to the solution in a volumetric flask and top up with distilled water to the mark. Shake and allow to stand for 4 – 5 minutes. Label the resultant solution DA3

- (d) Pipette 25cm³ (or 20cm³) of DA3 into a clean conical flask followed by 10cm³ of 1M sulphuric acid and then titrate with DA2 from the burette until the end point. Repeat the titration 2 – 3 times to obtain consistent results. Enter your results in the table below.

Mass of Q + empty bottle	=g
Mass of empty bottle	=g
Mass of Q alone	=g
Volume of pipette used	=cm ³

Titration number	1	2	3
Final burette reading/cm ³			
Initial burette reading/cm ³			
Volume of DA used/cm ³			

Titre values for calculating average volume of DA2

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Average volume of DA2 used:cm³

Questions

(e) Calculate the moles of

(i) Excess iron (II) ion that reacted with the MnO_4^- in DA2

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(ii) Excess iron (II) ions contained in 250cm³ of DA3

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(iii)Iron (II) ions that reacted with Q

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(f) Determine the ratio of reaction between Iron (II) ions and Q (RFM of Q = 270)

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2. You are provided with substance L which contains **two cations** and **two anions**. You are required to identify the cations and anions in L. Carry out the tests below and record your observations and deductions in the table below. Where a gas(es) is/are evolved, it should be identified (28 marks)

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat a spatula endful of L in a hard glass test tube first gently and then more strongly until there is no further change.		
(b) Put three spatula endfuls of L in a test tube. Add about 3cm ³ of water and shake vigorously. Then add dilute sodium hydroxide solution drop wise until in excess and filter. Keep both filtrate and residue		
(c) To the filtrate, add dilute nitric acid drop wise until the solution just becomes acidic. Then divide the resultant solution into seven parts		
(i) To the first part add dilute sodium hydroxide solution dropwise until in excess		

(ii) To the second part of the acidic solution, add aqueous ammonia dropwise until in excess		
(iii) Use the third part to carry out a test of your own to confirm one of the cations in L		
(iv) to the fourth part add about 1cm ³ of lead (II) nitrate and warm		
(v) To the fifth part of the acidic solution, carry out a test of your own to confirm one of the anions in L		
(vi) To the sixth part, add 3 – 4 drops of concentrated sulphuric acid followed by 4 drops of ethanol and heat.		
(vii) Use the seventh part to carry out a test of your own to confirm the second anion in L		

(d) To the residue from (b), add dilute hydrochloric acid until there is no further change. Divide the solution into three portions.		
(i) To the first portion, add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the second portion, add aqueous ammonia solution drop wise until in excess.		
(iii) To the third portion, add about 3 – 4 drops of potassium iodide solution followed by excess sodium thiosulphate solution		

- (e) Identify the
- (i) Cations in Land
- (ii) Anions in L and

3. You are provided with substance S which is an organic compound. You are required to determine the nature of S. Carry out the following tests on S and record your observations and deductions in the table below. (14 marks)

TESTS	OBSERVATION	DEDUCTIONS
(a) Burn a small amount of S on a spatula end or on a crucible lid		
(b) To a spatula endful of S in a test tube, add 2cm ³ of sodium hydroxide solution and shake.		
(c) To a spatula endful of S in a test tube, add about 3cm ³ of water. Warm the mixture and test the solution with litmus. Divide the hot solution into two parts.		
(i) To the first part of the warm solution, add half a spatula endful of sodium carbonate		
(ii) To the second part of the warm solution, add Iron(III) chloride solution		
(d) To a spatula endful of S, add about 5 – 6 drops of methanol followed by 2 – 3		

drops of concentrated sulphuric acid. Heat the mixture and pour into a small beaker of cold water. Allow to stand.		
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(e) Comment on the nature of S

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END