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NAME:	e?	INDEX NO:	
SCHOOL:	k.k.	STREAM:	
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233/3 CHEMISTRY			
CHEMISTRY 55			
THEORY			
PAPER 3			
MAY – JUNE 2014			
TIME: 2 HOURS			
\$ ¹⁰			

BUNYORE – MARANDA (BUMA) JOINT EXAMINATIONS CHEMISTRY PAPER 1 2014

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Answer ALL the questions in the spaces provided in the question paper.
- You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ½ hours allowed for this paper. This time it to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All working MUST be clearly shown where necessary
- Mathematical tables and electronic calculators may be used.

FOR EXAMINER'S USE ONLY

QUESTION	MAX. SCORE	SCORE
1	20	
2	14	
3	6	
TOTAL SCORE	40	

Eor Wor

- 1. You are provided with: -
 - 4.5g of solid A in a boiling tube.
 - Solution B, 0.06M acidited Potassium manganate (VII)

You are required to determine

- (1) The solubility of solid A at different temperatures.
- (2) The number of moles of water of crystallization in solid A.

PROCEDURE©

- (a) Using a burette, add 4cm3 of distilled water to solid A in the boiling tube. Heat the maxture while stirring with the thermometer to about 70°C. When the entire solid has dissolved, allow the solution to cool while stirring with the thermometer. Note the temperature at which crystals of solid A firs appear. Record this temperature in table 1.
- (b) Using the burette, add 2cm³ of distilled water to the contents of the boiling tube. Warm the mixture while stirring with the thermometer until all the solid dissolves. Allow the mixture to cool while stirring. Note and record the temperature at which crystals of solid A firs appear.
- (c) Repeat procedure (b) two more times and record the temperatures in table I. Retain the contents of the boiling tube for use in procedure (e)
- (d) (i) Complete table 1 by calculating the solubility of solid A at the different temperatures. The solubility of a substance is the mass of the substance that dissolves in 100cm³ (100g) of water at a particular temperature. (6 marks)

Table 1

		Solubility of solid A (g/100g
tube (cm ³)	of solid A first appear (⁰ C)	water)
4		
6		
8		
10		

- (ii) On the grid provided, plot a graph of the solubility of solid A (vertical axis against temperature). (3 marks)
- (iii) Using your graph, determine the temperature at which 100g of solid A would dissolve in $100cm^3$ of water. (1 mark)

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(e) (i) Transfer the contents of the boiling tube into a 250ml volumetric flask. Rinse both the boiling tube and the thermometer with distilled water and add to the volumetric flask. Add more distilled water to make up to the mark. Label this solution A. Fill a burette with solution B. Using a pipette and a pipette filler, place 25.0cm³ of solution A into a conical flaks. Warm the mixture to about 70°C. Titrate the hot solution A with solution B until a permanent pink colour persists. Record your readings in table 2. Repeat the titration two more times and complete table 2. (Retain the remaining solution B for use in question 3).

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Table 2

3400	I	II	III	
Final burette reading				
Initial burette reading				
Volume of solution B used (cm ³)				
× ,		·		

	(ii) Calculate the: Average and solution B wood	(3 marks)
	1. Average volume of solution B used.	(1 mark)
, c	e	
t More Ere	II. Number of moles of potassium manganate (VII) used.	(1 mark)
Ç		
	III. Number of moles of A 25cm ³ of solution A given that 2	
	manganate (VII) react completely with 5 moles of A.	(1 mark)
	VI. Relative formula mass of A.	(2 marks)

(2 marks)

(1 mark)

	76·
	oage .
	a de tra
iii) To the second portion,	add aqueous ammonia dro

wise until in excess.

Observations	J.C.	Inferences
* * * * * * * * * * * * * * * * * * *		
with.		
The state of the s		
, air		
γ_{λ}		
20	(1 mark)	(1 mark)

(c) To 20m³ of the filtrate, add 3 drop of potassium iodide solution.

Observations	Inferences
4cs,	
e ·	
(1 mark)	(1 mark)

(d) To 2cm³ of filtrate, add 3 drops of acidified barium nitrate solution.

(a) To Zem of matter, and a drops of actually matter solution.	
Observations	Inferences
(1 mark)	(1 mark)

- (e) To the residue in (a) add 8cm³ of dilute nitric acid and allow it to filter into a boiling tube. (i) To 2cm³ of this filtrate, add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

3. Dissolve all of solid G in about 10cm³ of distilled water in a boiling tube. Use the solution for tests (a) to (c) below.

(a) Place 2cm³ of the solution of a test tube and add 2 drops of acidified potassium manganate (VII), solution befrom the burette.

Observations	Inferences
in.	
, gi ^X	
\mathcal{A}_{λ}	
a Rets	
Q ^{oV} (1 mar	(1 mark)

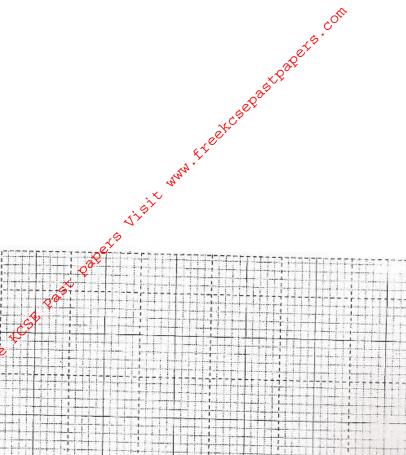
(b) To 2cm³ of the solution in another test-tube, add 2-3 drops of bromine water.

10 2cm of the solution in another test-tube, and 2-3 drops of bromme water.		be, and 2-3 drops of brothine water.
	Observations	Inferences
	e	
Ç	e	
	(1 mark)	(1 mark)

(c) To 2cm³ of the solution in a third test-tube add a spatula full of the sodium hydrogen powder provided.

Observations		Inferences	
	(1 mark)		(1 mark)

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