Name ..... Adm. No..... Class.....

Signature..... .....

Index Number.....

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CHEMISTRY
PAPER 3
PRACTICAL
2 ¼ HOURS

ALLIANCE HIGH SCHOOL
PRE – TRIAL EXAMINATION 2016

INSTRUCTIONS TO CANDIDATES

- *Answer **All** 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** 2¼ hours allowed for this paper. This time is 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.

Questions	Maximum Score	Candidate's Score
1	22	
2	09	
3	09	
Total	40	

1. You are provided with:
4.5g of solid A in a boiling tube.
Solution B, 0.06 M acidified 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 I

a) Using a burette, add 4cm^3 of distilled water to solid A in the boiling tube. Heat the mixture while stirring with the thermometer to about 70°C. When all the solid has dissolved, allow the solution to cool while stirring with the thermometer. Note the temperature at which crystals of solid A first appear. Record this temperature in table I.

b) Using the burette, add 2cm^3 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 first appear.

c) Repeat procedure (b) two more times and record the temperatures in table 1. **Retain the contents of the boiling tube** for use in procedure II.

d) i) Complete table 1 by calculating the solubility of solid A at the different temperatures.

Table 1

Volume of water in the boiling tube (cm^3)	**Temperature at which crystals of solid a first appear (°C)**	**Solubility of solid A (g/100g water)**
4		
6		
8		
10		

(6 mks)

ii) On the grid provided, plot a graph of the solubility of solid A (vertical axis) against temperature.

III number of moles of A in 25cm^3 of solution A given that 1 moles of Potassium Manganate reacts completely with 5 moles of A.

(1 mk)

ii) The formula of A has the form $D.xH_2O$. Determine the value of x in the formula given that the relative formula mass of D is 90 and the atomic masses of oxygen and hydrogen are 16.0 and 1.0 respectively. (2 mks)

2. a) Place solid Q in a boiling tube and add about 10cm^3 of distilled water while shaking. Filter the Solution and divide the filtrate into four portions. Keep the residue for part (b)

Observations	Deductions
(1mk)	(1mk)

i) To the first portion, add Sodium hydroxide drop by drop till in excess.

Observations	Deductions
(1mk)	(1mk)

ii) To the second portion, add a few drops of Lead (II) nitrate solution.

Observations	Deductions
(1mk)	(1mk)

iii) Using your graph, determine the temperature at which 100g of solid A would dissolve in $100cm^3$ of water

(1 mk)

PROCEDURE II

Transfer the contents of the boiling tube into a 250ml volumetric flask. Rinse the boiling tube add the contents 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 $25.0cm^3$ of solution A into a conical flask. Warm the mixture to about 60^oC. Titrate the hot solution A with solution B until a permanent pink colour persists. Record your readings in table 2

Table 2.

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution B used (cm^3)			

(4 mks)

i) Calculate the:

I average volume of solution B used

(1 mk)

II number of moles of Potassium Manganate (VII) used.

(1 mk)

iii) To the third portion, add a few drops of nitric (V) acid.

Observations	Deductions
(1mk)	(1mk)

b) Place the residue obtained in (a) above in a boiling tube and add dilute Nitric (V) acid little by little while shaking until the solid JUST dissolves. Divide the solution into three portions.

Observations	Deductions
(1mk)	(1mk)

i) To the first portion add Sodium hydroxide dropwise till in excess.

Observations	Deductions
(1mk)	(1mk)

ii) To the second portion ad a few drops of dilute Sulphuric (VI) acid.

Observations	Deductions
(1mk)	(1mk)

3. You are provided with solid **F**. Carry out the following tests and record your observations and deductions in the space provided

a) Scoop half a spatula full of solid **F** using a clean dry spatula. Burn it in a non luminous flame.

Observations	**Deductions**
(1mk)	(1mk)

b) Place the remaining solid **F** into a boiling tube. Add $5cm^3$ of distilled water and shake to dissolve the solid. Divide the resulting solution in to three portions.

i) Determine the pH of the first portion.

Observations	**Deductions**
(1mk)	(1mk)

ii) To the first portion add three drops of acidified Potassium Dichromate (VI) and warm gently.

Observations	**Deductions**
(1mk)	(1mk)

iii) To the second portion add three drops of acidified Potassium Manganate (VII) solution and warm gently.

Observations	**Deductions**
(1mk)	(1mk)

END