

Name:

Index No:

School:

Candidate's Signature.....

Date:

233/3

CHEMISTRY

Paper 3(Practical)

April 2014

Time: 2 ¼ Hours

TRANS-MARA WEST ASSESSMENT TEST (TWAT)

Kenya Certificate of Secondary Education(K.C.S.E)

CHEMISTRY

Paper 3(Practical)

April 2014

Time: 2 ¼ Hours

INSTRUCTIONS TO CANDIDATES:

- Write your **name, index number and school** in the spaces provided above
- **Sign and write** the date of examination in the spaces above
- Answer **ALL** the questions in the spaces provided in the question paper
- You are not allowed to start working with apparatus for the first 15 minutes. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus required;
- Mathematical tables and silent electronic calculators may be used
- All working must be clearly shown where necessary

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	22	
2	12	
3	6	
TOTAL	40	

This paper consists of 9 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

1. You are provided with;

- 5.0g of solid A in a boiling tube
- Solution B, 0.07M acidified potassium manganate (VII)

You are required to determine;

- The solubility of solid A at different temperatures.
- The number of moles of water of crystallization in solid A.

Procedure 1

- 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 80°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 1.
- Using the burette, add 2cm^3 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 mixtures to cool while stirring. Note and record the temperatures at which crystals of solid A first appear.
- Repeat procedure (b) two more times and record the temperature in table 1. Retain the content of the boiling tube for use in procedure II (a).
- Complete table 1 by calculating the solubility of solid A at the different temperatures. The solubility of a substance is the mass of that substance that dissolve in 100cm^3 (100g) of water at particular temperature.

Table I

(6 marks)

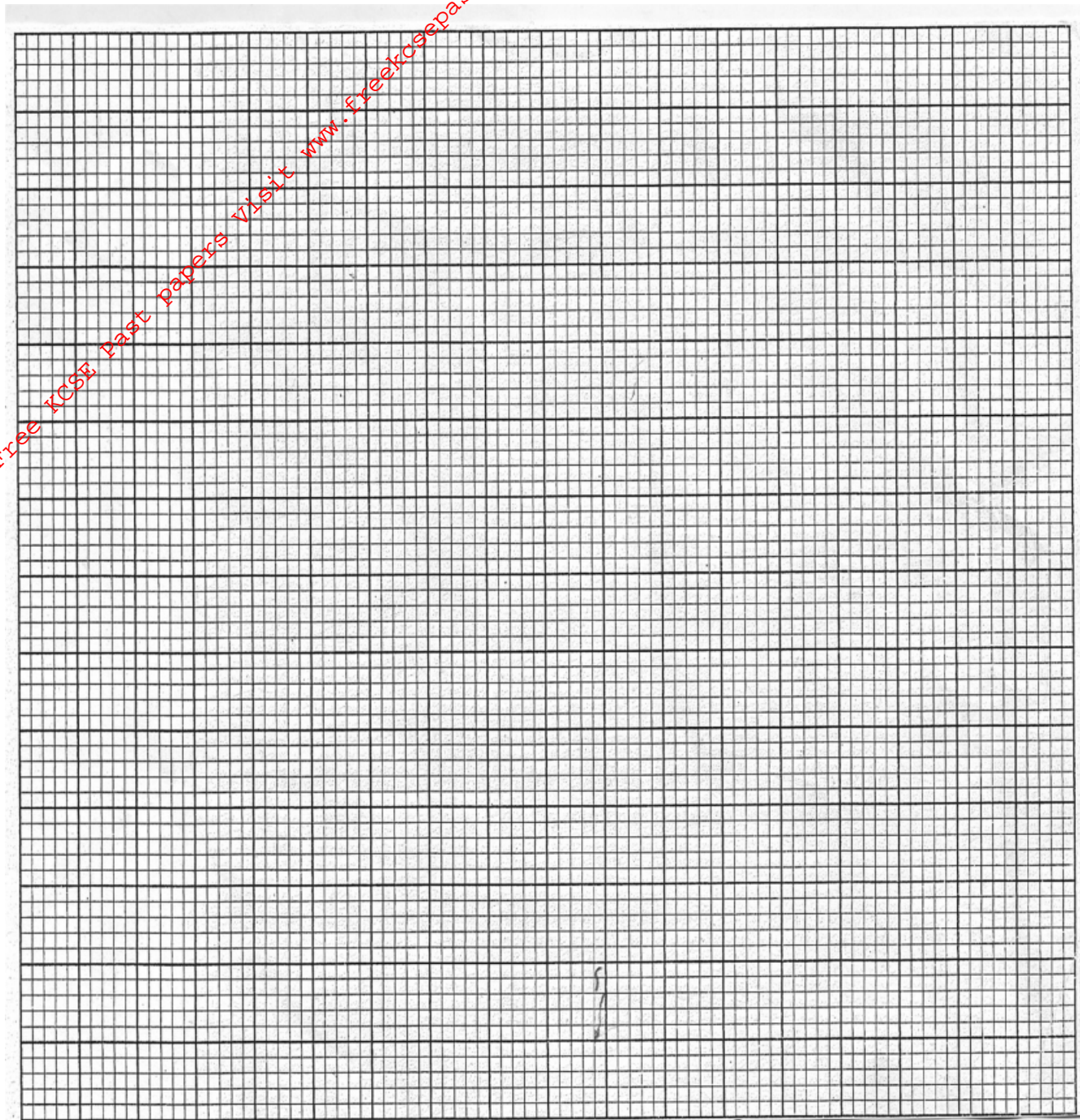
Volume of water in the boiling tub(cm^3)	4	6	8	10
Temperature at which crystals of solid A first appear ($^\circ\text{C}$)				
Solubility of solid A				

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

(3 marks)

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

(1 mark)



Procedure II

- (a) (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 flask. Warm the mixture to about 60°C. Titrate the hot solution A with solution B until a permanent pink colour persist. Record your readings in table 2. Repeat the titration two more times and complete table 2.

Table 2.

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

(4 marks)

(ii) Calculate the:

(a) Average volume of solution **B** used.

(1 marks)

(b) Number of moles of potassium Manganate (VII) used.

(1 mark)

(c) Number of moles of A in 25cm³ of solution A given that 2 moles of Potassium Manganate (VII) reacts completely with 5 moles of A.

(1 mark)

(d) Relative formula mass of A.

(3 marks)

(iii) The formula of A has the H₂C₂O₄ XH₂O. Determine the value of x in the formula given that the relative masses of carbon is 12 and that of oxygen and hydrogen are 16.0 and 1.0 respectively.

(2 marks)

2. You are provided with solid **P**. Carry out the tests below. Write your observations and inferences in the spaces provided.

(a) Place about one third of solid **P** in a clean dry test-tube and heat it strongly.

Observations	Inferences
(1 mark)	(1 mark)

(b) Place the remaining solid **P** in a boiling tube. Add about 10cm³ of distilled water. Shake the mixture thoroughly for about one minute. Filter and divide the filtrate into four portions.

Observations	Inferences
(1 mark)	(1 mark)

(i) To the first portion, add 2cm³ of dilute hydrochloric acid.

Observations	Inferences
(1 mark)	(1 mark)

(ii) To the second portion, add 2 drops of methyl orange indicator.

Observations	Inferences
(1 mark)	(1 mark)

(iii) To the third portion, add 5cm³ of aqueous sodium sulphate.

Observations	Inferences
(1 mark)	(1 mark)

(iv) To the fourth portion, add dilute sodium hydroxide drop wise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

3. You are provided with solid **Q**. carry out the following tests and record your observations and inferences in the spaces provided.

(a) Using a metallic spatula, take one-third of solid **Q** and ignite it using a Bunsen burner flame.

Observations	Inferences
(½ mark)	(½ mark)

(b) Place the remaining solid **Q** in a boiling tube. Add about 10cm³ of distilled water. Shake the mixture until all the solid dissolves.

(i) To about 3cm³ of the solution, add 2 to 3 drops of acidified potassium dichromate (VI) solution.

Observations	Inferences
(½ mark)	(½ mark)

((ii) To about 3cm³ of the solution, add 2 to 3 drops of acidified potassium manganate (VII)

Observations	Inferences
(1 mark)	(1 mark)

- (i) To about 2cm^3 of the solution add 2 to 3 drops of bromine water. Then warm the mixture.

Observations	Inferences
(1 mark)	(1 mark)