Name……. **Index No**……/…….

School…… **Candidates Signature**……

Date ……..

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

CHEMISTRY

Paper 3

PRACTICAL

2 ¼

Instructions to candidates

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- 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 2 ¼ 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 workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	12	
3	16	
TOTAL SCORE	40	

02

1. You are provided with:

2.0g of solid V
Distilled water
You are required to:
-Find the solubility of the solid V in different volumes of water and temperatures of distilled water.
-Draw the solubility curve for solid V
Procedure
Fill the burette with distilled water; transfer the 2.0g of V into a dry clean boiling tube.

Experiment I

Run from the burette 5.0cm^3 of water into the boiling tube containing the solid V. Warm the mixture **till all solid has just dissolved.**

Place a thermometer into the solution, remove the solution from the flame and allow it to cool while string with the thermometer. Note the temperature at which the **crystals start to appear** and record this temperature in table 1 below. Retain the mixture.

Procedure II

To the mixture above in the boiling tube used in the experiment I add another 5.0cm^3 distilled water from the burette. Warm the mixture till all the solid has just dissolved. Place the thermometer in the solution and cool the solution by **dipping the boiling tube in a beaker of cold water**, stirring with the thermometer. Note and record the temperature at which the crystals start to appear.

Perform experiment III, IV, and V following the procedure as in experiment II.

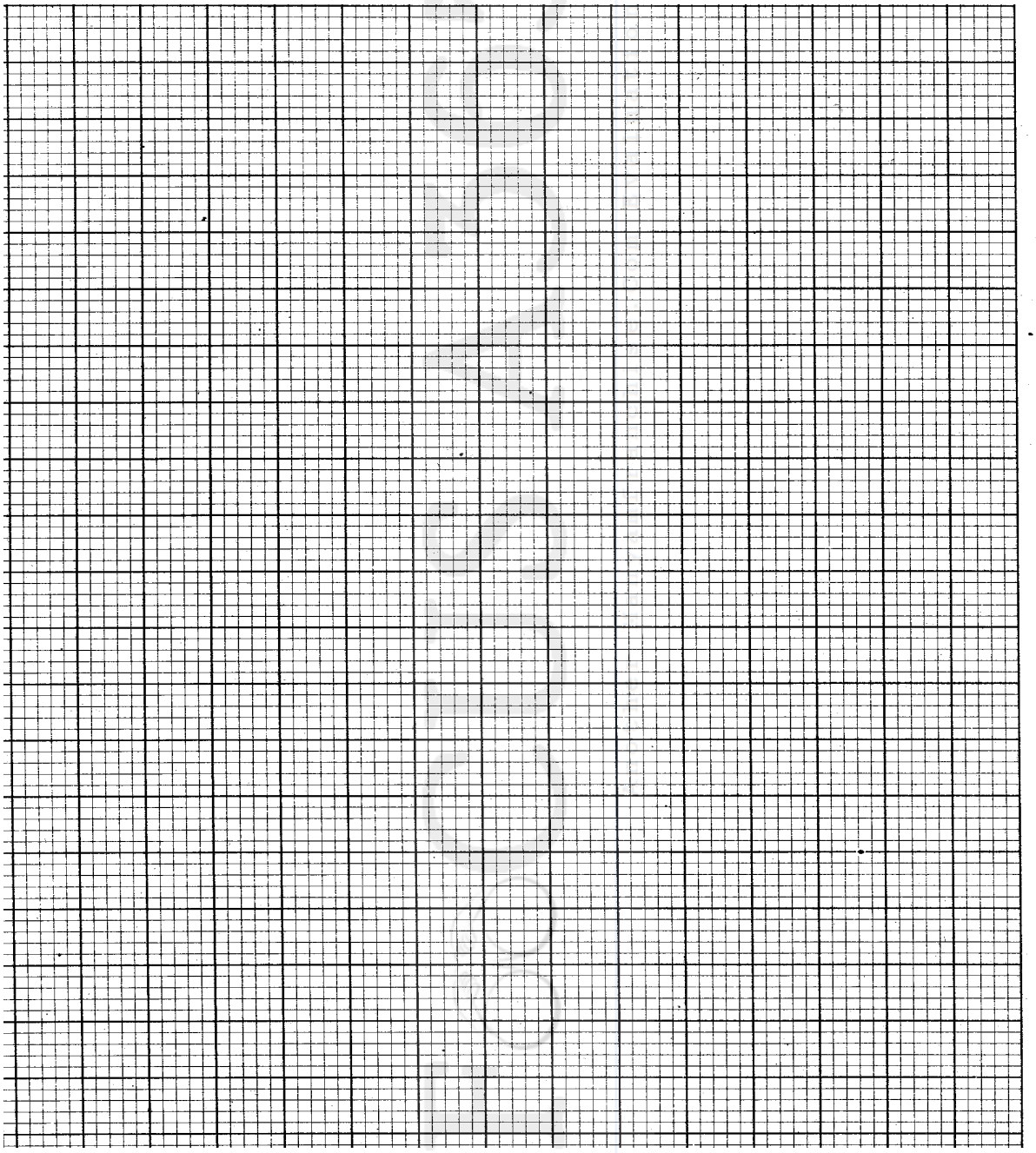
(Density of water is 1g/cm^3) (6mks)

Table 1

(a)

Experiment	**I**	**II**	**III**	**IV**	**V**
Total volume of distilled water cm^3	5.0	10.0	15.0	20.0	25.0
Solubility of solid V g per 100g of water					
Crystallization temperature , ^{0}C					

(b) On the page provided plot a graph of solubility of V (vertical axis) against crystallization temperature.
(3mks)



(a) What is the relationship between the solubility of V and change in temperature?
(1 mk)

(b) Using your graph, determine the temperature at which 100g of V would dissolve in 100g of water
(1mk)

(c) A solution containing 20g of solid V in 1oog of water is cooled from 70 ^{o}C at :-

(i) What temperatures will the crystals form first?
(1mk)

(ii) What will be the mass of Solid V deposited if the above solution is cooled to 40^{o}C?
(1mk)

2. You are provided with solid **W**. Carry out the following tests and write your observations and inferences in spaces provided.

[a] Heat a spatula end full of solid W in a boiling tube. Test any gases produced with both red and blue litmus papers.

Observation	Inferences
1mk	1mk

[**b**]Put spatula end full of solid W in a boiling tube and then add a few drops of sodium hydroxide solution and heat. .Test the gas produced using red and blue litmus papers.

Observation	Inferences
1mk	1mk

[**c**]Dissolve the remaining solid W in distilled water in a test tube.

Divide the solution into four portions.

Observation	inferences
1mk	1mk

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[i]To the first portion add sodium hydroxide solution drop wise till in excess.

Observation	inferences
1mk	1mk

[ii]To the second portion, add ammonium hydroxide drop wise till in excess

Observation	inferences
1mk	1mk

[iii]To the third portion, add a few drops of dilute sulphuric acid.

Observation	inferences
1mk	1mk

[iv]To the forth portion, add a few drops of barium nitrate solution.

Observations	inferences
1mk	1mk

3.You are provided with solid X.Carry out the tests below and write your observations and inferences.

[a]Using a clean metallic spatula, heat a third of solid P in Bunsen burner flame.

Observations	Inferences
1mk	1mk

[b]Dissolve the remaining portion of solid X into a $10cm^3$ of distilled water in boiling tube. Divide the solution into four portions.

Observation	Inferences
1mk	1mk

[i]To the 1st portion, add 3 drops of acidified potassium manganate(Vii) and warm.

Observation	Inferences
1mk	2mk

[ii]To the 2nd portion,add 2-3 drops of bromine water and warm.

Observation	Inferences
1mk	1mk

[iii]To the third portion, add spatula of sodium carbonate provided.

Observation	Inferences
1mk	1mk

[iv]To the forth portion, determine the pH of the solution using a universal indicator paper.

Observation	Inferences
1mk	1mk