**School…………………………………………………………… Candidate’s sign………………**

**Date…………………………………**

Subukia Sub-county Joint Assessment

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

**233/3**

**CHEMISTRY**

**PAPER 3**

**(PRACTICAL)**

**Time: 2 ¼Hours**

## INSTRUCTIONS TO CANDIDATES

1.Write your name and index number in the spaces provided.

2.Sign and write the date of examination in the spaces provided.

3.Answer ALL the questions in the spaces provided in the question paper

4.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 required.

5.ALL working MUST be clearly shown where necessary

6.Mathematical tables and electronic calculators may be used.

 **FOR EXAMINER’S USE ONLY**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **MAXMUM SCORE** | **CANDIDATE’S SCORE** |
| 1 | 13 |  |
| 2 | 14 |  |
| 3 | 13 |  |
| **TOTAL** | 40 |  |

This paper consist of 10 printed pages

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 5.0cm3 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 5.0cm3 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/cm3) (6mks)

Table 1

(a)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Experiment** | **I** | **II** | **III** | **IV** | **V** |
| Total volume of distilled water cm3 |  5.0 |  10.0 |  15.0 |  20.0 |  25.0 |
| Solubility of solid V g per 100g of water |  |  |  |  |  |
| Crystallization temperature , 0C |  |  |  |  |  |

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



1. What is the relationship between the solubility of V and change in temperature? (1 mk)
2. Using your graph, determine the temperature at which 100g of V would dissolve in 100g of water (1mk)
3. A solution containing 20g of solid V in 1oog of water is cooled from 70 oC at :-
4. What temperatures will the crystals form first? (1mk)
5. What will be the mass of Solid V deposited if the above solution is cooled to 40oC? (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 |

,

[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 10cm3 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 |