**NAME: ……………………………………. INDEX NUMBER: ……………………………..**

**SCHOOL: ……………………………… CANDIDATE’S SIGNATURE: ………………..**

 **DATE: ……………………………………………**

**233/3**

**CHEMISTRY**

**PAPER 3**

**PRACTICAL**

**JUNE 2018**

**2 ¼ Hours**

**KASSU**

 **JOINT EVALUATION TEST - 2018**

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

**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.
* 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 | 10 |  |
| 2 | 13 |  |
| 3 | 17 |  |

*This paper consists of 6 Printed pages.*

*Candidates should check the question paper to ensure that all the*

*Papers are printed as indicated and no questions are missing.*

Q1. You are provided with :2g of substance A labelled solid A

* You are required to determine the solubility of substance A in water.

**Procedure 1**

1. Place 200cm3 of tap water in a 250ml beaker and keep it for use in step (VI)
2. Place all the substance A in a dry boiling tube boiling.
3. Using a burette measure 10.0cm3 of distilled water and add to substance A in the boiling tube.
4. While stirring the mixture in the boiling tube with a thermometer, warm the mixture using a Bunsen burner until the temperature rises to 65$℃. $Stop warming the mixture.
5. Allow the mixture to cool while stirring with the thermometer.
6. When the temperature drops to 60$℃ ,$ start the stop watch / clock, place the boiling tube in a beaker with tap water prepared in step (i) above.
7. **Co**ntinue stirring and record the temperature of the mixture after two minutes then thereafter record the temperature of the mixture after every one minute interval and complete the table 1. **Table 1.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time in minutes | 0 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Temperature ($℃)$ | 60 |  |  |  |  |  |  |  |  |  |

 (4mks)

1. On the graph provided, plot a graph of temperature (vertical axis) against time. (3mks)
2. Using the graph, determine the temperature (T) when 2.0g of substance A dissolves completely in 10cm3 of distilled water. (1mk)
3. Calculate the solubility of substance A in grammes per 100g of water at temperatures (T) (2mks)

2. You are provided with:

* 1M Potassium iodide solution
* 0.5m Lead (II) nitrate solution
* Ethanol

You are required to determine the formulae of lead (II) iodide and the equation for the reaction between lead (II) nitrate and potassium iodide.

**Procedure**

Take 5 test tube and label them 1, 2,3,4,5 and 6,7. Using a burette add to separate test tube volumes of aqueous potassium iodide and aqueous lead (II) nitrate as shown in the table below; followed by 3-4 drops of ethanol. Stir and allow to settle. Measure the height of the precipitate in each test tube in mm and record the measurements in the table below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test tube no | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Volume of KI (cm3) | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Volume of Pb(NO3)2 cm3 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| Height of the precipitate (mm) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

1. Plot a graph of height of the precipitate against the volume of lead (II) nitrate. (4mks)

1. Use your graph to
2. Find the maximum height of the precipitate formed. (1mk)
3. Determine the volume of the 0.5M Pb (NO3)2 used in b (i) above (1mk)
4. Determine the volume of 1M Potassium Iodide that completely reacts with 0.5M Pb (NO3)2 (aq) Potassium iodide solution. (2mks)
5. Use your answer in b(ii) above to determine the number of moles iodide ions which reacts with one mole of lead (II ) ions hence determine the formulae of lead (II) iodide. (2mks)

3. You are provided with

* Substance W 0.5g
* Sodium hydroxide
* Aqueous ammonia
* Solution F – aqueous lead (II) Nitrate
* Distilled water in wash bottle
* Source of heat
1. Describe the appearance of substance W
2. Add 10cm3 water to substance W

|  |  |
| --- | --- |
| Observation | Inference |
|  ($^{1}/\_{2}mk)$ |   ($^{1}/\_{2}mk)$ |

1. Substance W is suspected to be calcium chloride.

From the reagent provided and results in procedure (b) above select and describe four tests that could be carried out consequently to confirm substance W is calcium chloride. Write the results and expected observation in the spaces provided. (6mks)

|  |  |
| --- | --- |
| Test 1 | Expected observation |
|    (1mk)  |   (1mk) |

|  |  |
| --- | --- |
| Test 2 | Expected observation |
|  (1mk) |  (1mk |

|  |  |
| --- | --- |
| Test 3 | Expected observation |
|  (1mk) |  (1mk) |

1. Carry out the tests described in (c) above using substance W and record the observations and inferences in the spaces provided.
2. Test 1

|  |  |
| --- | --- |
| Observation | Inference (1mk) |

1. Test 2

|  |  |
| --- | --- |
| Observation | Inference (1mk) |

1. Test 3

|  |  |
| --- | --- |
| Observation | Inference (1mk) |

4. You are provided with substance P. Carry out the following test and record your observation and inferences in the spaces provided. Use above 2cm3 of portion of substance P in a test tube for each tests a, b, c and d

1. Add about 2 or 3 drops of bromine water.

|  |  |
| --- | --- |
| Observation | Inference |
|  ($^{1}/\_{2}mk$) |  ($^{1}/\_{2}mk$) |

1. Add about 1cm3 of acidified potassium dichromate (VI) warm the mixture.

|  |  |
| --- | --- |
| Observation | Inference |
|  (1mk) |  (1mk) |

1. Add about 1cm3 of solution to E (aqueous sodium carbonate provided)

|  |  |
| --- | --- |
| Observation | Inference |
|  ( $^{1}/\_{2}mk)$ |  ( $1mk)$ |

1. Add the piece of magnesium ribbon provided

|  |  |
| --- | --- |
| Observation | Inference |
|  ($^{ 1}/\_{2}mk$) |   ($1mk)$ |