**Name…………………………………..Adm No………..Index No…………………Class……**   
 **Signature………………………..**

**Date……………………………..**

**233/3**

**CHEMISTRY**

**PAPER 3**

**(PRACTICAL)**

**March, 2018**

**2 ¼ hours**

**MOKASA EXAMINATION 2018**

**CHEMISTRY PRACTICAL 233/3**

***(Kenya Certificate of Secondary Education)***

***Instructions***

* *Write your name, admission number and class in the spaces provided above.*
* *Sign and write the date of examination in the spaces provided above.*
* *Spend the first 15 minutes of the 2 ¼ hours to read through the paper and make sure you have all the apparatus and chemicals required.*
* *Answer* ***all*** *the questions in the spaces provided in the question paper.*
* *Electronic calculators may be used.*
* *All working* ***must*** *be clearly shown where necessary.*
* *This paper consists of* ***7*** *printed pages. Confirm this and that no questions are missing.*

**For Examiner’s Use Only**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s score** |
| **1** | **20** |  |
| **2** | **10** |  |
| **3** | **10** |  |
| **Total** | **40** |  |

1. You are provided with;

* 4.5g of Solid A in a boiling tube
* Solution B, sodium hydroxide
* 0.1M monobasic acid, solution C.

You are required to;

1. Determine molarity of solution B,
2. Determine the solubility of solid A

**Procedure I**

1. Using a measuring cylinder, place 50cm3 of solution B into a clean 250ml beaker. Add 100cm3 of distilled water to the solution and label it as solution D.
2. Fill the burette with solution C
3. Using a pipette filler, place 25cm3 of solution D into a 250ml conical flask. Add two drops of phenolphthalein indicator.
4. Titrate solution D with solution C and record your results in table 1 below
5. Repeat the titration two more times and complete table 1.

**Table 1**

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| Final burette reading |  |  |  |
| Initial burette reading |  |  |  |
| Volume of solution C used ( cm3) |  |  |  |

(4mks)

1. Calculate the average volume of solution C used. (1mk)

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1. Calculate moles of solution C used in the experiment. (1mk)

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1. Calculate moles of solution D used. (1mk)

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1. Calculate molarity of solution D. (1mk)

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1. Calculate molarity of solution B. (2mks)

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**Procedure II**

1. Using measuring cylinder, add 20cm3 of distilled water to solid A in the boiling tube. Using a glass rod, stir the mixture thoroughly for about three minutes.
2. Filter the mixture obtained into 250ml volumetric flask and top it to the mark with distilled water. Label the filtrate as solution A.
3. Clean the burette and fill it with solution A.
4. Using a pipette filler, place 25cm3 of solution D into 250ml conical flask. Add two drops of phenolphthalein indicator.
5. Titrate solution D with solution A and record your results in table 2 below.
6. Repeat the titration two more times and complete table 2.

**Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| Final burette reading |  |  |  |
| Initial burette reading |  |  |  |
| Volume of solution A used ( cm3) |  |  |  |

(4m (4mks)

1. Calculate the average volume of solution A used. (1mk)

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1. Calculate the number of moles of solution D used. (1mk)

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1. Calculate the number of moles of solution A used given that 2 moles of solution A requires one mole of solution D for complete neutralization.

(1mk)

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1. Determine the number of moles of solution A in 250cm3 (1mk)

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1. Determine the solubility of solid A given that the density of the solution formed is 1g/cm3 and the RFM of A = 126. (2mks)

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1. You are provided with solid E. carry out the tests below. Write your observations and inferences in the spaces provided.
2. Place all solid E into a boiling tube and add 10cm3 of distilled water. Shake the boiling tube and filter into a clean test-tube . Keep the residue for test (b). Divide the filtrate into three portions.

|  |  |
| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |

1. To the first portion, add 2M NaOH drop wise until in excess.

|  |  |
| --- | --- |
| Observations      (1mk) | Inferences  (1mk) |

|  |  |
| --- | --- |
| Observations    (1 mk) | Inferences  (1mk) |

1. To the second portion, add 2M ammonia solution drop wise until in excess.
2. To the third portion, add three drops of barium nitrate solution followed by 2cm3 of 2M HNO3.

|  |  |
| --- | --- |
| Observations        (1 mk) | Inference    (1mk) |

1. Place the residue into a clean test-tube. Add about 5cm3 of 2 M HNO3 and shake until all the solid dissolves. Divide the solution into three portions.
2. To the first portion, add 2M NaOH drop wise until in excess.

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| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |

1. To the second portion, add three drops of sodium sulphate solution.

|  |  |
| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |

1. To the third portion, add three drops of potassium iodide solution.

|  |  |
| --- | --- |
| Observations    (1mk) | Inferences  (1mk) |

1. You are provided with solid F. Carry out the tests below. Record your observations and inferences in the spaces provided.
2. Burn half spatula endful of solid F in anon-luminous flame of a Bunsen burner.

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| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |

1. Transfer the remaining solid F into a clean boiling tube and add about 5cm3 of distilled water. Shake until all the solid dissolves. Divide the solution into two portions.
2. To the first portion add 3 drops of acidified potassium Manganate ( VII) solution.

|  |  |
| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |

1. Test the pH of the second portion using a universal indicator paper.

|  |  |
| --- | --- |
| Observations  (1mk) | Inferences  (1mk) |