**Name**…………………………………… …………………………..………… Index No:………………………….

**233/3** Candidate’s Signature …………..……………

**CHEMISTRY** Date…………………………………..

**PAPER 3**

**PRACTICAL**

**2 ¼ Hours**

[](https://teacher.co.ke/notes/)

[**SERIES 21 EXAMS**](https://teacher.co.ke/notes/)

**INSTRUCTIONS TO CANDIDATES**

* Write your **name** and **index number** in the spaces provided.
* **Sign** and write the **date** of examination in the spaces provided.
* Answer ***all*** the 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 you need.
* All working **must** be clearly shown where necessary.
* Mathematical tables and electronic calculators may be used.

**For examiners use only**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s Score** |
| **1** | **19** |  |
| **2** | **15** |  |
| **3** | **06** |  |
| **Total** | **40** |  |

*This paper consists of 5 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

**Question 1**  (20marks)

***You are provided with;***

* Solid **A** in a boiling tube
* Solution **B**, sodium hydroxide
* 0.125M.monobasic acid, solution **C**

***You are required to;***

1. Determine molarity of solution **B**
2. Determine solubility of solid **A**

**Procedure I**

1. Using a measuring cylinder ,place 50cm3 of solution **B** into an empty 250ml beaker. Add 100cm3 of distilled water to the solution. Labe this solution as solution **D**.
2. Fill the burette with solution **C**
3. Using pipette filler, place 25cm3 of solution d into a 250ml conical flask. Add two drops of phenolphathatlein indicator.
4. Titrate solution **D** with solution **C**
5. Record your results in table 1 . repeat the titration two more times and complete table 1.

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

(4mks)

1. (i) Calculate average volume of solution **C** used. (1mk)
2. Calculate moles of solution **C** used in the experiment. (1mk)
3. Calculate moles of solution **D** used. (1mk)
4. Calculate molarity of solution **D** (1mk)
5. Calculate molarity of solution **B**. (2mks)

**Procedure II**

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

Table 2

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

(4mks)

1. Calculate;
2. Average volume of solution **A** used (1mk)
3. Moles of solution **D** used (1mk)
4. Moles of solution **A** used given that 2 moles of solution A requires 1 mole o f solution **D** for complete neutralization (1mk)
5. Solubility o solid A given that density of the solution formed is 1g/cm3 and RFM of **A** = 126.

(2mks)

2 You are provided with solid **D**. perform the following test and write the observations and inferences.

1. Place solid **D** into a boiling tube and add 10cm3 of distilled water. Shake the boiling tube and filter. Keep the residue for test (b). Divide the filtrate into four portions.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| (1mk) | (1mk) |

1. To the first portion, add sodium hydroxide dropwise until in excess.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| (1mk) | (1mk) |

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| (1mk) | (1mk) |

1. To the second portion, add ammonioa solution dropwise until in excess.

1. To the third portion, add a few drops of Lead(II) nitrate solution

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( ½ mk) | ( ½ mk) |

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |

1. To the fourth portion, add a few drops of barium nitration solution followed by dilute nitric (v) acid.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( ½ mk) | ( ½ mk) |

1. Place the residue into attest tube and add 10cm3 of dilute nitric (v) acid and shake until the solid dissolves.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |

1. To the first portion, add sodium hydroxide dropwise until in excess.
2. To the second portion, add ammonia solution dropwise until in excess.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |

1. To the third portion, add a few drops of sodium sulphate solution.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( ½ mk) | ( ½ mk) |

3. You are provided with solid L . Carry out the tests below and record your observation and inferences in the space provided.

(a) Heat half spatula of solid L in a non-luminous flame of aBunsen burner.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |

1. Add 5cm3 of distilled to the remaining solid L and shale well. Divide the solution into two portion.

(i) To the first portion, add a few drops of acidified potassium manganate (VII) and warm

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |

1. To the second portion, add a quarter spatula and fill of sodium hydrogen carbonate.

|  |  |
| --- | --- |
| **Observation** | **Inferences** |
| ( 1 mk) | ( 1mk) |