**MWAKICAN JOINT EXAM(MJET)**

**FORM 3**

**CHEMISTRY – 233/3**

**PAPER 3**

**PRACTICAL**

**TERM 2 2019**

**TIME: 2 ¼ HOURS**

**NAME:…………………………………………………………..ADM.NO:………………………………….CLASS:………………….**

**INSTRUCTIONS:**

1. Write your name, admission number and class
2. Answer all the questions in the spaces provided
3. Spend the first 15 minutes of the 2 ¼ hours to read the questions paper and ensure you have all the chemicals and apparatus that you may need.
4. All working must be clearly be shown where necessary
5. Mathematical tables and silent calculators may be used
6. Answer all the questions in English language

For examiner’s use only

|  |  |  |
| --- | --- | --- |
| **Questions** | **Maximum score** | **Candidates score** |
| 1 | 20 |  |
| 2 | 20 |  |
| Total  | 40 |  |

1. You are provided with the following reagents.
* 60cm3 of solution M which is IM hydrochloric acid
* About 80cm3 sodium hydroxide solution K made by dissolving 5.6g of sodium hydroxide into 200cm3 of distilled water and diluting it to make 1dm3 of the solution K.
* Anhydrous sodium carbonate solid X of unknown mass.
* Methyl orange indicator

 You are required to determine the mass of solid X in grams using the procedure below.

 **Procedure:**

 Place all the solid X into a 250cm3 volumetric flask provided. Use your burette to transfer 50cm3 of solution M into the 250cm3 volumetric flask containing solid X and allow the reaction to take place until the effervescence stops. Add the distilled water using the wash bottle to fill to the mark and label the resulting solution N. Pipette 25.0cm3 of solution K into a 250.0cm3 conical flask and add 2 to 3 drops of methyl orange indicator. Swirl the contents. Rinse your burette with distilled water and fill it with solution N.

Titrate solution K with N until a colour change just occurs. Repeat the titrations to complete the table below.

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

 (3mks)

1. Calculate the average volume of solution N used (1mk)
2. Calculate the number of moles of:
3. Solution K that reacted in the experiment above (Na=23, H=1, O=16) (3mks)
4. Solution N that reacted in the above experiment (2mks)
5. Solution N in 250cm3 (2mk)
6. 50cm3 of solution M before reaction with solid X (2mks)
7. Hence or otherwise calculate the number of moles of:
8. Hydrochloric acid which reacted with solid X (2mks)
9. Solid X which reacted in the experiment (2mks)
10. Calculate the mass of solid X which was reacted above. (3mks) (Na=23, C=12, O=16)
11. Carry out the tests on the substances given and record your observations and inferences in the space provided.
12. i) Put half of solid A in a boiling tube. Add about 3cm3 of distilled water shake and retain the

 solution.

|  |  |
| --- | --- |
| Observation  | Inferences  |
|  (1/2 mk) |  (1/2 mk) |

ii)To the solution above, add a few drops of ammonia solution then add in excess.

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

1. Add the remaining half of solid A in a test tube and add about 3cm3 of water and dissolve. Dip a glass rod in the solution and burn the end dipped on a non-luminous flame.

|  |  |
| --- | --- |
| Observation  | Inferences  |
|  (1/2 mk) |  (1/2 mk) |

1. i) Put ½ of solid B in a test tube and add about 1cm3 of distilled water.

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

ii) Put the remaining solid in a test tube and add about 1cm3 of dilute hydrochloric acid

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

1. i) Put ½ of solid C in a test tube, heat gently then strongly observing the colour changes in the solid when heating and after cooling. Test any gas produced with wet litmus paper and a glowing splint.

|  |  |
| --- | --- |
| Observation  | Inferences  |
|  (3mks) |  (1mk) |

ii) Put the remaining solid C in a test tube and add about 2cm3 of distilled water, shake well add ammonia solution dropwise then in excess.

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

1. Divide solution F into 3 portions.
2. Test the pH of the first portion with universal indicator

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

1. In the second portion drop a piece of magnesium ribbon and test for any gas produced with burning splint.

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

1. To the third portion add a ¼ spatula of sodium hydrogen carbonate.

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