MWAKICAN JOINT EXAMINATION (MJET)

FORM 3

CHEMISTRY – 233/3

PAPER 3

PRACTICAL

TERM 3 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:-
2. 2.86g of solid E, Na2CO3 x H2O
3. Solution W, 0.1M hydrochloric acid

You are required to-

1. Prepare a dilute solution of Na2CO3 . XH2O
2. Determine the value of X in Na2CO3 . XH2O

Procedure:

Step 1

Place all the solid E in a 250ml volumetric flask. Add about 150ml of distilled water. Shake the mixture well until the solid dissolves. Add distilled water up to mark. Label this solution D.

Step 11

Using a pipette and pipette filler place 25.0cm3 of solution D into a conical flask. Add two drops of the indicator provided. Fill the burette with solution W and titrate solution D. with solution W. Record your results in the table below. Repeat the titration two more times and complete the table below.

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

(4mks)

1. Calculate
2. Average volume of solution W used (1mk)
3. Moles of solution W, hydrochloric acid used. (2mks)
4. The equation for the reaction that took place is:

Na2CO3(aq) + 2HCl (aq)→ 2 NaCl (aq) + CO2(g) + H2O (l)

Calculate:

1. Moles of solutionD, Na2CO3 . XH2O used (2mks)
2. Moles of solutionD, Na2CO3 . XH2O in 250cm3 of solution (2mks)
3. Molarity of solutionD, Na2CO3 . XH2O (2mks)
4. Relative formula mass of Na2CO3 . XH2O (3mks)
5. The mass in grams of the water of crystallization in a litre of solution ∆ (Na= 23, C=12, O = 16, H = 1) (2mks)
6. The value of X in Na2CO3 . XH2O (2mks)
7. a) You are provided with solid Y. Carry out the tests below and identify the ions.
8. Add all solid Y in a boiling tube. Add about 10cm3 of distilled water. Divide the solution into 4 portions.

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

1. To the first portion add three drops of sodium hydroxide then in excess.

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

1. To the second portion add three drops of ammonium hydroxide then in excess

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

1. To the third portion add three drops of lead(II) nitrate and warm

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

1. To the forth portion add three drops of hydrochloric acid.

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

b) You are providedwith solid X. Carry out the tests below.

i) Scoop half of solid X using a spatula and heat over non-luminous flame.

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

ii)Put the remaining solid X in a boiling tube and add about 10cm3 of distilled water. Divide

the solution into 3 portions.

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

1. To the first portion add 3 drops of universal indicator

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

1. To the second portion add sodium carbonate provided.

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

1. To the third portion add three drops of acidified potassium manganate (VII) solution.

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