**PRESIDENT’S OFFICE**

**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**

**LINDI REGIONAL COMMISSIONER’S OFFICE**

**FORM FOUR MOCK EXAMINATION**

**CHEMISTRY 2A ACTUAL PRACTICAL**

**CODE NO.032/2A May, 2018**

**TIME: 2:30 HOURS**

**INSTRUCTIONS:**

1. This paper consists of three (3) questions.
2. Answer ALL questions in this paper.
3. Qualitative Analysis Guidance sheet may be used after a thorough check by the supervisor.
4. Cellular phones and calculators are NOT allowed in the examination room.
5. Write your examination number on every page of your answer booklet(s)
6. You may use the following constants;

Na = 23, O = 16, H = 1, Cl = 35.5, S = 32

1. You are provided with the following solutions
2. Solution R containing 2g of pure sodium hydroxide per cubic decimeter of solution
3. Solution Q containing 5.2g of impure sulphuric acid in 1lite
4. Methyl orange indicator

**PROCEDURE**

1. (i) Pipette 25cm3 (or 20cm3) of solution R into conical flask. Add few drops of methyl orange indicator.

Titrate the solution R against Q until a colour change is observed. Repeat the procedure to obtain three more readings and record your results in a tabular form

1. Volume of pipette used was ……. cm3
2. …………….. cm3 of solution R required ………….. cm3 of solution Q for complete neutralization
3. (i) Write down a well balanced equation between R and Q and the corresponding ionic equation with state symbols

(ii) Calculate the molarity of R

(iii) Calculate the concentration of Q in moles/dm3

(iv) Calculate the concentration of Q in g/dm3

(v) Calculate the percentage purity of Q

1. You are provided with the following;
2. Y: a solution of 0.127moles $N\_{2}S\_{2}O\_{3} per dm^{3}$
3. T a solution of 2M HCl
4. Stop watch
5. Thermometer

**PROCEDURE**

1. Using 50cm3 or 100cm3 measuring cylinder, measure 50cm3 of solution Y and put into 250cm3 beaker. Add 50cm of distilled water
2. Draw a cross (X) on a piece of white paper
3. Place the beaker on top of gauze on a tripod stand. Heat the beaker with a gentle Bunsen burner flame; stir the solution by using thermometer until the temperature reach 300C.
4. Stand the beaker on the paper above the cross and immediately add 5cm3 of solution T. At the same time start the stop watch.
5. Swirl the mixture well and place the beaker over the cross
6. Look down vertically through the mouth of the beaker. Stop the stop watch immediately as soon as the cross X is obscured.
7. Record the time taken for the cross to disappear
8. Repeat the experiment three more times starting with the temperature of 400C, 500C and 600C in each time 5cm3 of solution T
9. Record your results as shown bellow.

**Table 1**

|  |  |  |
| --- | --- | --- |
| Temperature of $Na\_{2}S\_{2}O\_{3} of solutionin 0C$ | Time it takes for the cross to disappear (in sec) | Rate $^{1}/\_{t(s^{-1})}$ |
| 30 |  |  |
| 40 |  |  |
| 50 |  |  |
| 60 |  |  |

Questions

1. With state symbols write the balanced chemical equation for the reaction between Y and T
2. What is the reaction product which obscured the cross
3. Plot a graph of $^{1}/\_{t}$ on (x-axis) and the temperature (on the y-axis)
4. What does the shape of the graph indicate.
5. Sample M is a hydrated salt 5 water molecules, contains one cation and one anion. Carefully carry out the experiments described below and record your observations inferences and hence identify the cation and anion present in the sample M.

|  |  |  |
| --- | --- | --- |
| Experiment | Observation | Inference |
| A | Appearance of sample M |  |  |
| B | Make a stock solution M by putting a spatulaful of the salt in a large test of the  |  |  |
| C | To one portion of the solution add sodium hydroxide till in excess |  |  |
| D | To another portion of solution slowly add Ammonium hydroxide till in excess |  |  |
| E | To another portion add potassium ferrocynide solution |  |  |
| F | To another portion add Barium Chloride (BaCl2) solution |  |  |
| G | To another portion add lead acetate solution |  |  |

Conclusion:

1. The cation in sample M is ……………………
2. The anion in sample M is ……………………..
3. The chemical formula of sample M is …………………
4. Write the ionic equation in stage (c) above