**HOLA SECONDARY SCHOOL**

**MID TERM EXAMINATION**

**CHEMISTRY PRACTICAL**

**YEAR 2013**

**TERM ONE**

**FORM 4**

**PAPER 3**

**TIME: 2 HOURS 15 MINUTES**

**NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_CLASS\_\_\_\_\_\_\_\_\_ADM/NO.\_\_\_\_\_\_\_\_\_\_\_**

**ANSWER ALL QUESTIONS**

1A) You are provided with:

1. Solution A obtained by dissolving 5.0g in a litre of solution of a dibasic acid, H2Y;
2. Solution B obtained by dissolving 4.0g in a litre of sodium hydroxide;
3. Phenolphthalein indicator
4. A burette, a pipette (25cm3) and 2 conical flasks.

You are required to determine the relative formula mass of anion Y2 in the acid H2Y.

**Procedure**

1. Fill the burette with solution A.
2. Pipette 25cm3 of B into a conical flask.
3. Add 2 – 3 drops of phenolphthalein indicator to the solution in the conical flask.
4. Titrate solution A in the burette against solution B in the conical flask.
5. Record your readings in the table below. Repeat the procedure two more time and complete the table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| Final burette readings |  |  |  |
| Initial burette readings |  |  |  |
| Volume of A used. |  |  |  |

**(4mks)**

Required:

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

b) Calculate the molarity of solution B, sodium hydroxide.

(Na = 23, O = 16, H = 1) (1mk)

c) How many moles of sodium hydroxide are contained in 25cm3 of solution B? (1mk)

c) How many moles of dibasic acid H2 Y are contained in the volume used? (2mks)

1. Calculate the concentration of solution A, that is, the dibasic acid in the moles per litre. (1mk)

1. Calculate the relative formula mass of the acid H2Y. (1mk)
2. Determine the relative formula mass of the anion Y2. (1mk)

2. You are provided with 0.30g of metal X and 1M hydrochloric acid.

You are required to determine the enthalpy of the reaction ( between X and hydrochloric acid.

Procedure

1. Using a measuring cylinder, put 50cm3 of the acid in the plastic beaker provided. Note that steady initial temperature of the acid.
2. Carefully add the metal X (0:30g) to the acid and note the temperature every 2 minute up to a total of Twelve minutes. Stir the mixture with the thermometer throughout. Record the temperature in the table.

|  |  |
| --- | --- |
| **Time (Minutes)** | **Temperature (oC)** |
| 0.0 |  |
| 2.0 |  |
| 4.0 |  |
| 6.0 |  |
| 8.0 |  |
| 10.0 |  |
| 12.0 |  |

(4MKS)

Required:

1. On a graph paper, plot a graph of temperature (oC) against time(minutes) (4mks)
2. Using the graph, determine the change in temperature (T), and show it on your graph. (1mk)
3. How many moles of X were used in the experiment? (x = 24) (1mk)
4. Calculate the heat evolved or absorbed in the experiment, given that the density of the solution is 1 g/cm3 and the pecific heat capacity of the solution is 4.2kJ kg-1K-1 . (2mks)
5. Calculate the enthalpy change of the reaction given by the equation:

X(s) + 2H+(aq) X2 + H2(g) (2mks)

1. You are provided with solid G. Carry out the following tests and note down your observation and inferences. Identify any gas(es) evolved.

|  |  |  |
| --- | --- | --- |
| **Procedure** | **Observation** | **Inference** |
| 1. Put a spatulaful of solid G in a boiling tube and heat gently, then strongly note the colour changes and test for the gas(es) produced. (4mks) | (2mks) | (2mks) |
| 1. Dissolve a spatulaful of solid G in 20cm3 of distilled water in a boiling tube and divide the solution into 5 portions. | (1mk) | (1mk) |
| 1. To one portion, add sodium hydroxide solution dropwise, until in excess. | (1mks) | (1mks) |
| 1. To the second portion add ammonia solution dropwise until in excess. | (1mk) | (1mk) |
| 1. To the third portion add 5 cm3 of !m HCl solution | (1mk) | (1mk) |
| To the fourth portion, add a little nitric acid and then silver nitrate solution | (1mk) | (1mk) |