CHEMISTRY PP3

You are provided with the following;

-.07 M Sodium hydroxide

-0.24 g Mg powder

-Sulphuric (VI) acid solution P

You are required to determine the concentration of the acid

**PROCEDURE 1**

Using a measuring cylinder Place 50$cm^3$ of the acid in a plastic beaker

Using a thermometer measurethe temperature of the acid and record it in table below

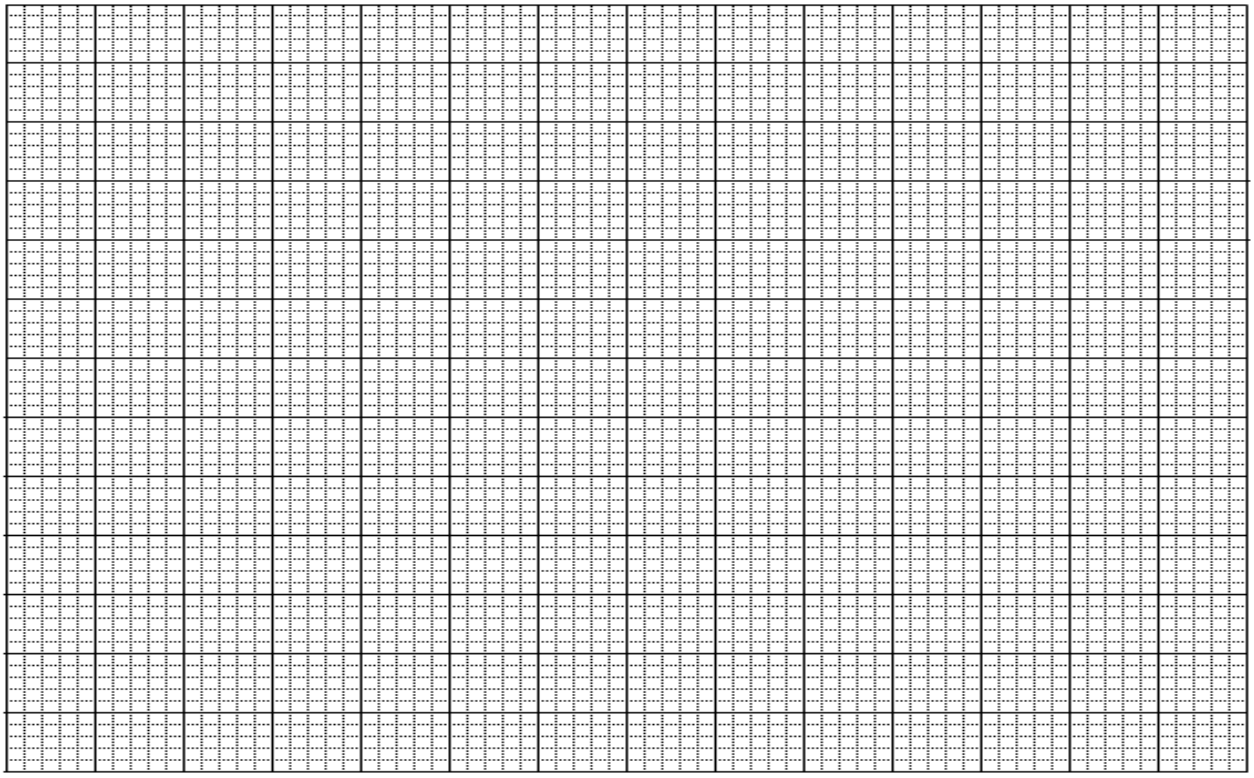
Continue measuring the temperature of the acid after ever thirty seconds and record it until one and a half minute.

At exactly two minutes add all the magnesium into the acid. Stir and .continue measuring the temperature and recording it after every thirty seconds until the sixth minute

| Time(minutes) | o | ½ | 1 | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 5½ | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature( $^oC$) | | | | | X | | | | | | | | |

4mks

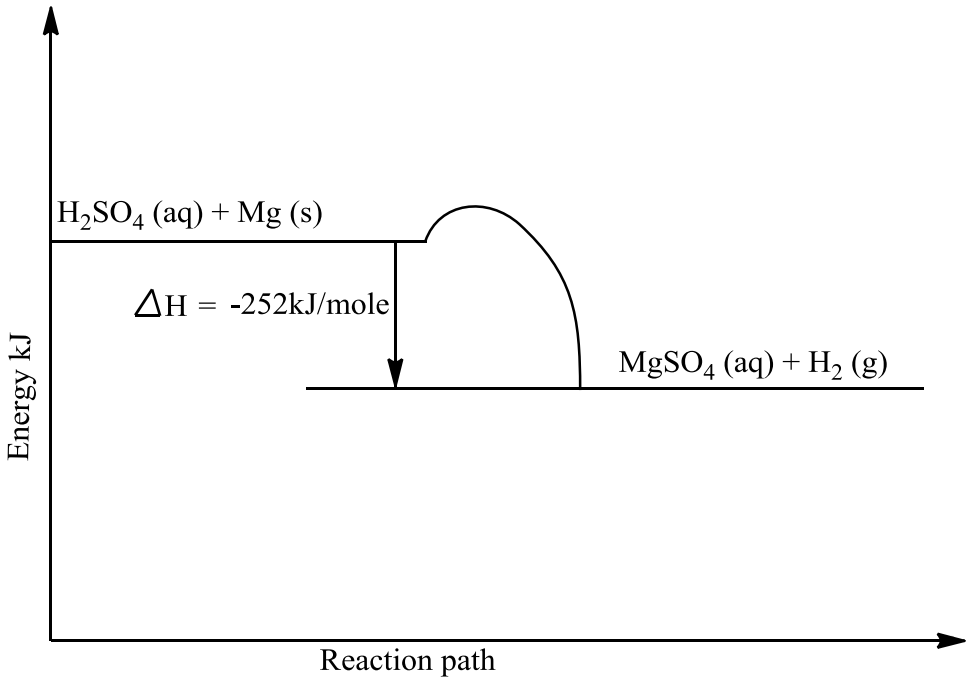
a) on the grid below draw a graph of temperature (Y axis) against time.(3mks)



b) on your graph show the highest change in temperature( $\Delta T$)(1mk)

c) use your value in (b) above to calculate the heat change for the reaction(c=4.2J/g/kdensity of solution =1g/$cm^3$) (2mks)

d) use the energy level diagram below to calculate the moles of acid that reacted (1mk)




**PROCEDURE 2**

Transfer all the contents in the beaker into a 250ml volumetric flaskAdd distilled water as you shake to 250ml mark. Label this solution Q

Fill the burette with sodium hydroxide.

Pipette 25$cm^3$ of Q into a clean conical flask

Carry out titration using phenolphthalein indicator

| ) | 1 | 2 | 3 |
|---|---|---|---|
| Final burette reading( $cm^3$)) | | | |
| Initial burette reading($cm^3$) | | | |
| Volume of sodium hydroxide used($cm^3$) | | | |

(4mks)

e) calculate:

(i) the average titre volume(1mk)

ii) the moles ofsodium hydroxide used(1mk)

iii) Moles of sulphuric (vi) acid used(1mk)

iv) molarity of sulphuric (vi) acid in solution P(2mk)

2. You are provided with solid C. Carry out the following tests and write your observations and inferences in the spaces provided

a) Place a spatulaful of solid C in a boiling tube. Heat it gently then strongly. Test the gas produced if any using moist litmus papers

| Observation s | inferences |
|---|---|
| 1mk | 1mk |

b.) Put the rest of solid C in a boiling tube .Add 10$cm^3$ of distilled water and shake. Divide the resulting solution into four portions

i) To the first portion add sodium hydroxide drop wise till in excess then warm and test any gas given off using moist pH indicator paper

| Observations | inferences |
|---|---|
| 1mk | 1mk |

ii) To the second portion add ammonia solution drop wise till in excess

| observations | inferences |
|---|---|
| 1mk | 1mk |

iii) To the third portion add a few drops of lead (ii) nitrate and warm

| observations | inferences |
|---|---|
| 1mk | 1mk |

v) To the fourth portion add dilute nitric (V) acid followed by barium nitrate

| observations | inferences |
|---|---|
| 1mk | 1mk |

3-You are provided with solid z. carry out the tests described below and record your observations and inferences in the spaces provided'

ii) Ignite half a spatulaful of Z on a non luminous flame

| observation | inference |
|---|---|
| 1mk | 1mk |

iii) Place the remaining solid in boiling tube and add $6cm^3$ of water and shake. Divide the resulting mixture into 3 portions

iv) To the first portion add acidified potassium manganate( vII) and warm

| Observation | inferences |
|---|---|
| 1mk | 1mk |

v) To the second portion add acidified potassium dichromate (VI) and warm.

| observations | inferences |
|---|---|
| 1mk | 1mk |

vi) i) Using the remaining portion and the unused reagent, describe a procedure that can be used to test whether the solid is an organic acid and give expected observations if test is positive

| description | observations |
|---|---|
| 1mk | 1mk |

ii) Carry out the test you have described in e (i) above and record your observation and inferences in the spaces provided

| observations | inferences |
|---|---|
| 1mk | 1mk |