

Item1.

In a lesson of preparing salts, a group of S.2 students noticed that on increasing the concentration of hydrochloric acid, the rate of formation of the products from hydrochloric acid and magnesium increased. One of the members in the group urged them to visit the chemistry laboratory to prove this fact hoping to be assisted by the laboratory technician.

Manganese reacts with hydrochloric acid according to the following equation.



You have been invited by the chemistry laboratory technician to help the S.2 students confirm their observation.

You are provided with:

BA1 which is 0.8M Hydrochloric acid solution

BA2 Which is 1.0M hydrochloric acid solution

BA3 Which is 1.5M Hydrochloric acid solution

BA4 Which is 2.0M hydrochloric acid solution

BA5 Which is 2.5M Hydrochloric acid solution

Q is 15cm of magnesium ribbon

Task:

Design and carry out an investigation that can help the S.2 students verify their observation.

1. The descriptions of the reagents and chemicals specified below should **not** necessarily correspond with the descriptions in the question paper. Candidates must **not** be informed of the differences.
 2. Candidates are **not** allowed to use reference books (i.e. text books, booklets on qualitative analysis etc.) during examination.
 3. In addition to the fittings and substances ordinarily contained in a chemistry laboratory, each candidate will require:
 - 5 plastic beakers
 - 1 conical flask
 - 1 measuring cylinder of 50cm^3
 - 1 stop clock
 - 5 labels
 - 25cm^3 of BA1, BA2, BA3, BA4 and BA5
 - 15 cm of element Q
 - Thermometer
 - 5 cm of a squared sanding paper
- Q is magnesium ribbon.
BA1, BA2, BA3, BA4 and BA5 are different concentrations of hydrochloric acid of 0.8M, 1.0M, 1.5M, 2.0M and 2.5 prepared using distilled water and ($1.18\text{g}/\text{cm}^3$, 36%) of concentrated hydrochloric acid.