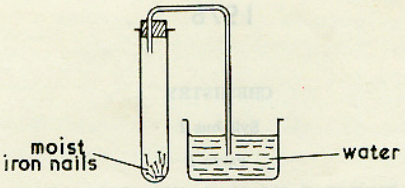
# CSE Science Paper 1976

This is a copy of the first page of the 1976 CSE science paper. Papers always start with the easy questions to give the candidates confidence. I leave you to decide if it's difficult but all that I can say is that I did 'o' level GCE – thank goodness!

## SECTION A

*Answer ALL QUESTIONS in this Section.*

**A1.**




The above apparatus was set up by a class, working in pairs. One boy, fond of a joke, helped his friend to set it up exactly as shown, except that he altered the iron nails in such a way that their results were not the same as the rest of the class.

(*a*) What would you expect the class to see when the experiment had stood until the next chemistry lesson a week later ?

(*b*) Explain why you would expect this to happen.

(*c*) Suggest **two** different ways in which the boy could have interfered with the iron nails to cause no result.

**A2.** In an experiment to prepare crystals of a salt, 100 $cm^3$ of dilute sulphuric acid was warmed in a beaker. A few pieces of granulated zinc were added, and bubbles were seen rising from the mixture, while particles of a black solid floated to the surface of the acid. The reaction was rather slow, but it was found that when just one drop of a solution of copper (II) sulphate was added, it went quite briskly.

More zinc was added from time to time until the reaction had obviously ceased. After filtering, the solution of the salt was evaporated until about half the water remained. The solution was then allowed to cool, as slowly as possible.

(*a*) Explain why bubbles were seen.

(*b*) How do you account for the effect of the drop of copper (II) sulphate solution ?

(*c*) How could you tell that the reaction had ceased ?

(*d*) Suggest **two** substances removed from the solution before it is evaporated.

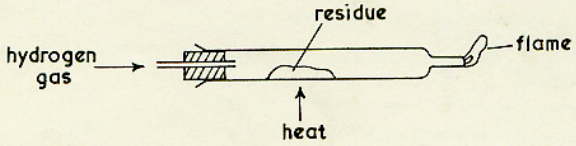
(*e*) What difference would it have made if the concentrated solution had been cooled quickly, under the cold water tap ?

(*f*) The crystals were corked in a specimen tube and labelled. What would be the name on the label ?

**A3.** A class was carrying out an investigation into a mineral called calamine, which is a white solid. One boy heated his sample in a test tube fitted with a delivery tube which led into limewater. He saw a stream of bubbles in the limewater, which turned milky.

(*a*) What did this test tell him about calamine ?

The residue after the calamine had been heated was yellow, but as it cooled down it became white. The boy then decided to treat the residue as shown in the diagram below :




(*b*) What was the boy hoping would happen ?

(*c*) Why is the flame at the end of the tube necessary ?

(*d*) When the boy had tried this, he again examined the residue. It was a yellow solid when hot which became white on cooling.
What conclusion could the boy draw from this ?

(*e*) The teacher now told the class that the white residue was zinc oxide. He explained that in industry it is converted into metallic zinc by roasting it with coke at 1450 °C. The boy therefore heated some of the zinc oxide with powdered charcoal over a bunsen flame. He could see no zinc in his test tube. What had gone wrong ?

(*f*) At the end of the lesson the class were asked for the chemical name of calamine. What would you have answered ?