

6. (a) Compare the reaction of the following metals with dilute sulphuric acid:
- (i) Aluminium (2 marks)
  - (ii) Iron (2 marks)
  - (iii) Copper (1 mark)
- (b) Suggest TWO precautions that should be taken when carrying out the reaction of aluminium with sulphuric acid. Give a reason for EACH precaution. (4 marks)
- (c) Why is it dangerous to react sodium and potassium with dilute sulphuric acid? (2 marks)
- (d) The Smith family moved into a new house which is very close to the beach. The contractor advised that in order to protect the iron windows, Mr Smith should paint them as soon as possible. Why did the contractor give this advice to the Smith family? (4 marks)

Write your answer to Question 6 here.

(e) a. Aluminium  $\rightarrow$  there would be fizzing in the tube, the temperature may raise. Vigorous reactions will take place. Hydrogen gas will be produced. If the metal had oxide, it will be removed after placing with Sulphuric acid. and the aluminium will be shiny.

ii) Iron - a slight reaction will take place. There will be slight fizzing. A small amounts of Hydrogen gas will be produced. If the iron was rusted, the metal will be shiny.

iii) Copper - There will be no reaction. taken place. Since copper is the lowest in the reactivity series & the least reactive metal.

b) Ensure that the Aluminium and Sulphuric acid do not touch any part of the body - This is a very strong reaction. If it touches body cells, ~~the~~ tissues, and parts they can become damaged.

ii) Place the test tube away the face when holding - The fumes given out from this reaction may be toxic and when inhaled may be dangerous to the body.

c) Sodium and Potassium are high up in the reactivity series. As such they are very reactive. Reacting them with Sulphuric Acid may be very dangerous and explosive; it may cause damages to body parts etc. As such the two metals should not be reacted with the acid.

d) If they do not paint the windows, ~~they~~ it will RUST. Iron, when reacted with ~~water~~ oxygen will ~~form~~ ~~a~~ oxidize and form a layer of flaky, red-brown colour, called rust. Since the Smith family have their house by the beachside, the iron windows will rust faster because the

Salt in the beach water will act as a catalyst. As such, rapid reactions will ~~take~~ take place faster.

To prevent rusting, the contractor asked the Smith family to paint the windows as soon as possible. This ~~paint~~ layer of paint will act as a protective layer for the iron. As such the <sup>(oxygen)</sup> water and catalyst (sea salt-water) will not come readily into contact with the iron window. As such, rusting will not take place.

**Integrated Science**  
**Paper 02 – June 2011**

Comments

Question 6: Exemplar 1

- Part (a)      This candidate was awarded full marks for this part because the candidate used appropriate scientific language to correctly compare the reaction of the three metals with dilute sulphuric acid.
- Part (b)      This candidate was awarded full marks for this part because the candidate suggested suitable precautions for the activity and gave appropriate reasons.
- Part (c)      This candidate was awarded full marks for this part because the candidate provided a clear and detailed response to explain the danger of the reactions.
- Part (d)      This candidate was awarded full marks for this part because the candidate provided a comprehensive, clear and detailed response using appropriate scientific terms. The candidate demonstrated the ability to use the knowledge of rusting, its causes and methods of prevention to adequately explain why the contractor would have given the advice.