GROUP 1: REACTIONS WITH WATER

1. a) Write the equation for the reaction between potassium and water.

   b) If you drop a small piece of sodium onto some water, it turns into a silvery ball which rushes around the surface, leaving a white trail in the water which dissolves to give a colourless solution. If the sodium becomes trapped on the side of the glass container there may be a flash of orange flame.

   (i) Why does the sodium turn into a small ball?

   (ii) Why does the ball rush around the surface of the water?

   (iii) What is the white trail in the water?

   (iv) What causes the orange flame if the sodium becomes trapped?

   (v) How does the reaction between potassium and water differ from that of sodium and water?

2. a) How does the reactivity of the Group 1 metals with water change as you go down the group?

   b) One of the energy changes that a Group 1 atom has to undergo during these reactions is known as atomisation energy. Write an equation to show the change which sodium undergoes when it is atomised.

   c) What happens to the atomisation energy of the elements as you go down the group? Explain your answer.

   d) Another change that has to occur involves the first ionisation energy of the elements. Write an equation to show the first ionisation energy of sodium.

   e) What happens to the first ionisation of the elements as you go down the group? Explain your answer.

   f) Overall, the enthalpy changes during these reactions are very similar – around -200 kJ mol^{-1}. Use your answers to (c) and (e) to explain why the reactivity of the elements changes down the group in the way you have stated in (a).