1 Sodium chloride, also known as common salt, can be made by reacting sodium and chlorine gas. The diagram below represents a sodium atom.

1 (a) Use the diagram to help you explain how a sodium atom turns into a sodium ion.

Give the exact charge on the sodium ion.

- The sodium ion loses electrons [1 mark]
- Loses one electron [2 mark]
- From the outer/outermost shell [1 mark]
- Charge of 1+ [1 mark]

You can get two marks for saying 'loses one electron'.
You must say that the charge is 1+, not just the charge is positive.
Talking about gaining a full outer shell or noble gas electron configuration is not relevant here.

1 (a) (i) The diagram below represents a chloride ion.

The chloride ion is negative, (Cl\(^{-}\)).

1 (a) (ii) Explain why the chloride ion has a negative charge. Use the diagram to help you.

- (The chloride ion or it) has one extra electron or one more electron than protons or it has 17 protons and 18 electrons. [2 marks]
- It has more electrons than protons [1 mark]

The underlined parts are important for the second mark.
1 (a) (iii) Chloride ions are strongly attracted to sodium ions in sodium chloride. Explain why.

Because oppositely charged ions attract each other

or

Because chloride ions are negative and sodium ions are positive [1 mark] 

(Total 6 marks)

2 Chlorine is an element which placed in group 7 of the periodic table (the halogens). There are more elements in group 7. You may use the data sheet to help you.

2 (a) (i) Name another element in group 7 of the Periodic Table.

One from: fluorine, bromine, iodine, astatine [1 mark] 

(1 mark)

2 (a) (ii) All group 7 elements can produce ions. What is the charge on the ions produced by group 7 elements?

1- [1 mark] Better to be safe and say 1-, not just 'negative'. 

(1 mark)

2 (a) (iii) The diagram below represents the lattice structure of a sodium chloride crystal.

2 (a) (iv) Explain why the ions in this lattice stay in place.

Sodium ions have a (single) positive charge and chloride ions have a (single) negative charge [1 mark] 

Ions with opposite charge are attracted (to each other) or positive sodium ions attract negative chloride ions [1 mark] 

(Positive and negative) ions are arranged alternatively (in each direction) [1 mark] 

(Total 5 marks)