6 This question is about the Periodic Table.

(a) State the name given to Group I elements.

..... [1]

(b) State which Group I element is least reactive.

..... [1]

(c) Lithium is in Group I of the Periodic Table.

When lithium is added to water a chemical reaction occurs.

(i) Give **two** observations when lithium is added to water.

1 .....

2 .....
[2]

(ii) Write a symbol equation for this reaction.

..... [2]

(d) Group I elements have lower melting points and lower boiling points than transition elements.

Describe **two other** physical properties of Group I elements that are different from transition elements.

1 .....

2 .....
[2]

(e) The Group VII elements are known as the halogens.

(i) Give the physical state and colour of chlorine at room temperature and pressure.

state .....

colour .....
[2]

(ii) When chlorine is passed through aqueous potassium bromide, a displacement reaction occurs.

The equation for the reaction is shown.

$$Cl_2 + 2KBr \rightarrow 2KCl + Br_2$$

Write an ionic equation for the reaction.

..... [2]

(iii) Iodine and chlorine react at high temperatures to form iodine monochloride, ICl.

The equation for the reaction is shown.

$$I_2(g) + Cl_2(g) \rightarrow 2ICl(g)$$

The structures of the molecules involved in the reaction are I–I, Cl–Cl and I–Cl.

Table 6.1

bond	bond energy in kJ / mol
I–I	150
Cl–Cl	242
I–Cl	218

Calculate the enthalpy change, ΔH, for the reaction using the bond energies in Table 6.1.

Use the following steps.

- Calculate the **total** amount of energy required to break the bonds in 1 mol of $I_2(g)$ and 1 mol of $Cl_2(g)$.

..... kJ

- Calculate the total amount of energy released when the bonds in 2 mol of ICl(g) are formed.

..... kJ

- Calculate the enthalpy change, ΔH, for the reaction.
  Your answer should include a sign.

..... kJ / mol
[3]

[Total: 15]