

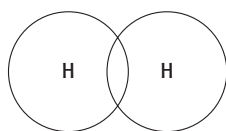
Worksheet 3.3

Chemical bonding

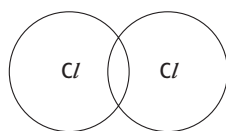
1 Covalent bonding diagrams

In all the following examples, make sure you use suitable symbols to indicate that the electrons come from different atoms.

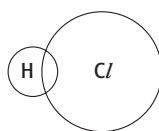
- a The following three diagrams can be completed to illustrate how single covalent bonds are formed between non-metal atoms. Draw in all the outer shell electrons in each case to show the bonding in these molecules.



hydrogen molecule H_2

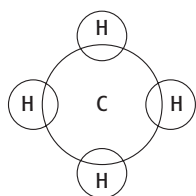


chlorine molecule
(each chlorine is now 2,8,8)

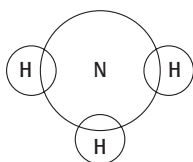


hydrogen chloride

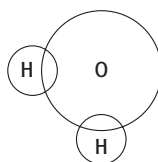
- b These are more complex examples of covalently bonded molecules. Complete the diagrams by drawing in the outer shell electrons in each case.



methane molecule

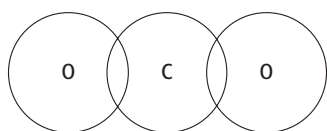


ammonia molecule

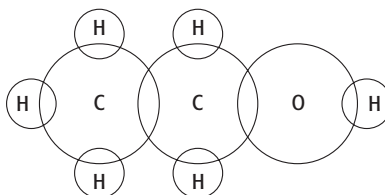


water molecule

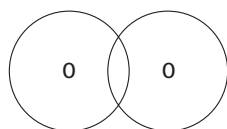
- c Finally, here are examples that involve multiple bonding or more than two types of atom. Complete the diagrams showing the bonding as for the earlier examples.



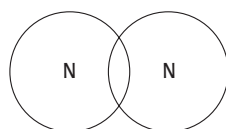
carbon dioxide, CO_2



ethanol, C_2H_5OH



oxygen, O_2



nitrogen, N_2

2 Diagrams showing ionic bonding

Complete these diagrams by drawing in the electrons and the charges on the ions in each case.

