Worksheet 4.1

Showing bonding with dot-and-cross diagrams

1 Draw dot-and-cross diagrams to describe how ionic bonds are formed in the following compounds.
- **a** sodium chloride
- **b** magnesium oxide [4]

2 Draw dot-and-cross diagrams to describe the covalent bonding in the following elements.
- **a** hydrogen
- **b** chlorine
- **c** oxygen [3]

3 Draw dot-and-cross diagrams to describe the covalent bonding in the following compounds.
- **a** hydrogen chloride
- **b** water
- **c** ammonia
- **d** methane
- **e** carbon dioxide
- **f** ethene
- **g** the ammonium ion [7]

4 Describe the difference between one of the N–H bonds in the ammonium ion and the other three N–H bonds. [2]

Questions **1–4** above all involve substances required in the exam syllabus. You should therefore ensure you can do them successfully before moving on to question **5**.

5 Draw dot-and-cross diagrams to describe the bonding in the following substances. Your first decision must be whether the bonding is ionic or covalent.
- **a** hydrogen sulfide
- **b** nitrogen
- **c** sodium oxide (before and after bonding)
- **d** fluorine
- **e** magnesium chloride (before and after bonding) [7]