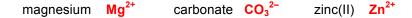


**1** Give the formula of the following ions.



2 Give the formula of the following ionic compounds.

| sodium oxide      | Na <sub>2</sub> O   | aluminium sulfide | $Al_2S_3$                                       |
|-------------------|---------------------|-------------------|---|
| calcium hydroxide | Ca(OH) <sub>2</sub> | ammonium sulfate  | (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> |

**3** Identify the structure type of the following substances.

| name           | propane | diamond | buckminster<br>-fullerene | potassium<br>bromide | bromine         | argon | copper<br>oxide | zinc |
|----------------|---------|---------|---------------------------|----------------------|-----------------|-------|-----------------|------|
| formula        | C₃H₀    | С       | C <sub>60</sub>           | KBr                  | Br <sub>2</sub> | Ar    | CuO             | Zn   |
| giant covalent |         | ✓       |                           |                      |                 |       |                 |      |
| ionic          |         |         |                           | ✓                    |                 |       | ✓               |      |
| metallic       |         |         |                           |                      |                 |       |                 | <    |
| molecular      | ✓       |         | ✓                         |                      | ✓               |       |                 |      |
| monatomic      |         |         |                           |                      |                 | ✓     |                 |      |

- 4 This question is about some different forms (allotropes) of the element carbon.
  - **a** Explain why diamond, graphite and graphene have high melting points.

have giant covalent structures need to break covalent bonds to melt covalent bonds are strong

**b** Explain why graphite and graphene conduct electricity.

has some delocalised electrons (one from each atom) so can carry charge through the substance

c Explain why diamond is hard but graphite is soft.

diamond: each C atom makes 4 covalent bonds in rigid 3D-network graphite: each C atom makes 3 covalent bonds forming layers; weak forces between layers