**Reading Two Boron Nitride Structures**

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A display contains two solids made only of boron and nitrogen. In both solids the overall ratio is one B atom for each N atom. Students receive simplified descriptions of the bond arrangements.

| **Solid** | **B–N bonding arrangement** |
|---|---|
| L | Covalent bonds join atoms within layers. Neighboring layers attract each other more weakly. |
| N | Covalent bonds connect atoms in a three-dimensional network. |

**1** What does the formula BN establish for both samples?

(1) Every B atom is bonded to exactly one N atom.

(2) Both solids contain individual two-atom molecules.

(3) The solids have the same three-dimensional structure.

(4) They have the same ratio of boron atoms to nitrogen atoms.

**2** Explain how layers in L can slide past one another without breaking most of the B–N bonds. [1]

Answer and work

In a model scratch test, N leaves a groove in L but L does not leave a groove in N. A student attributes the result to a different chemical formula for N.

**3** Use the formula and bonding descriptions to give a structural explanation for why the two solids can have different hardness. [1]

Answer and work

**4** An image of a third BN sample shows some B–N bonds, but its view hides any bonds above or below the image plane. Describe a feature an additional view could reveal to support the network model. [1]

Answer and work