**1.3.1 EXERCISE 3 – STRUCTURE AND BONDING IN THE PERIODIC TABLE**

**1. Complete the following table:**

|  |  |  |
| --- | --- | --- |
| Element | Bonding between atoms | Structure |
| Lithium |  |  |
| Beryllium |  |  |
| Boron |  |  |
| Carbon (diamond) |  |  |
| Carbon (graphite) |  |  |
| Nitrogen |  |  |
| Oxygen |  |  |
| Fluorine |  |  |
| Neon |  |  |
| Sodium |  |  |
| Magnesium |  |  |
| Aluminium |  |  |
| Silicon |  |  |
| Phosphorus |  |  |
| Sulphur |  |  |
| Chlorine |  |  |
| Argon |  |  |

**2. Draw diagrams to show the structure and bonding in the following elements:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lithium | beryllium | sodium | magnesium | aluminium |
|  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Boron | graphite | diamond | silicon |
|  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| nitrogen | oxygen | fluorine | neon | phosphorus | sulphur | chlorine | argon |
|  |  |  |  |  |  |  |  |

**3.** **Explain the following:**

a) Why the melting point increases from lithium to beryllium in Period 2, and from sodium to aluminium in Period 3

b) Why aluminium is a metal but boron is not, even though they are in the same group

c) Why boron, graphite, diamond and silicon have very high melting points

d) Why diamond is hard but graphite is soft

e) Why graphite conducts electricity but diamond does not

f) Why the melting point decreases in the order fluorine > oxygen > nitrogen > neon

g) Why the melting point decreases in the order sulphur > phosphorus > chlorine > argon