

(Covalent bonding and simple molecules)

Q1. (2018)

Chlorine reacts with hydrogen to form hydrogen chloride.

Explain why hydrogen chloride is a gas at room temperature.

Answer in terms of structure and bonding.

[3 marks]

Q2. (2019)

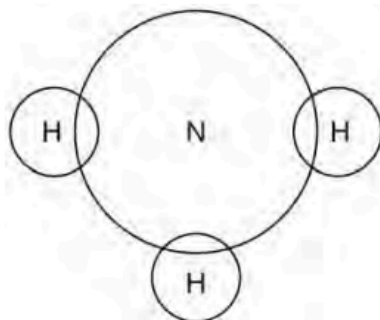
This question is about ammonia, NH_3

Complete the dot and cross diagram for the ammonia molecule shown in **Figure 6**.

Show only the electrons in the outer shell of each atom.

[2 marks]

Figure 6



Q3. (2019)

Give **one** limitation of using a dot and cross diagram to represent an ammonia molecule.

[1 mark]

Q4. (2019)

Explain why ammonia has a low boiling point.

You should refer to structure and bonding in your answer.

[3 marks]

Q5. (2020)

This question is about structure and bonding.

Which **two** substances have intermolecular forces between particles?

[2 marks]

Tick (✓) **two** boxes.

Diamond

☐

Magnesium

☐

Poly(ethene)

☐

Sodium chloride

☐

Water

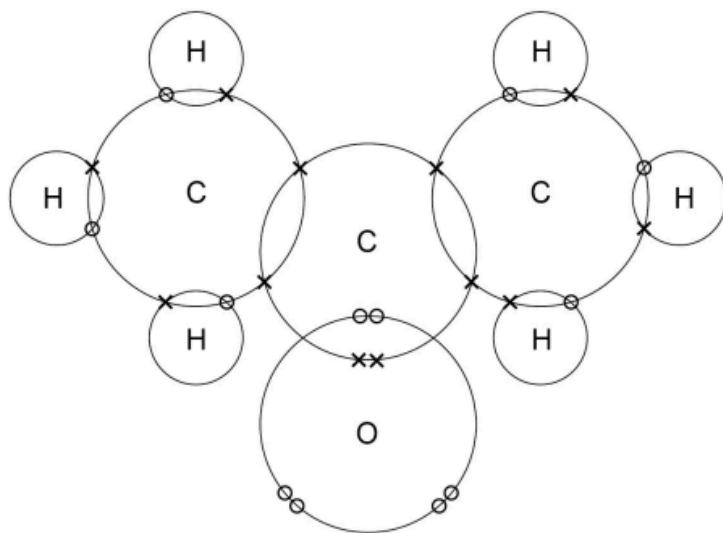
☐

Q6. a). (2021)

Propanone is a compound of carbon, hydrogen and oxygen.

Figure 1 shows the dot and cross diagram for a propanone molecule.

Figure 1



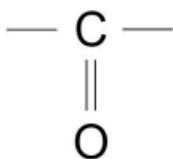
Complete **Figure 2** to show a propanone molecule.

Use a line to represent each single bond.

Use **Figure 1**.

[1 mark]

Figure 2



Q6. b). (2021)

Determine the molecular formula of propanone.

Use **Figure 1**.

[1 mark]

Molecular formula = _____

Q7. (2021)

Propanone is a liquid with a low boiling point.

Why does propanone have a low boiling point?

[1 mark]

Tick (✓) **one** box.

The covalent bonds are strong.

☐

The covalent bonds are weak.

☐

The intermolecular forces are strong.

☐

The intermolecular forces are weak.

☐

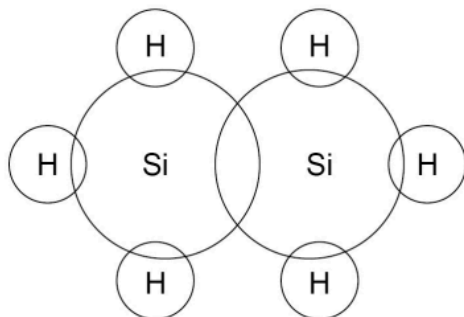
Q8. (2022)

Si_2H_6 is a covalent compound of silicon and hydrogen.

Complete **Figure 9** to show the outer shell electrons in a molecule of Si_2H_6

[1 mark]

Figure 9



Q9. (2023)

Draw a dot and cross diagram for a molecule of hydrogen chloride (HCl).

Show the outer shell electrons only.

[2 marks]

Q10. (2023)

Figure 5 represents molecules of methane and of poly(ethene).

Figure 5



Methane is a gas at room temperature but poly(ethene) is a solid at room temperature.

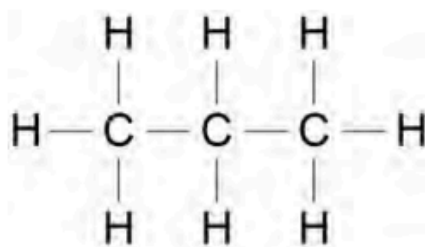
Explain why methane and poly(ethene) exist in different states at room temperature.

[4 marks]

This question is about propane (C_3H_8).

Figure 7 shows the displayed structural formula of propane.

Figure 7



Explain why propane has a low boiling point.

[3 marks]
