

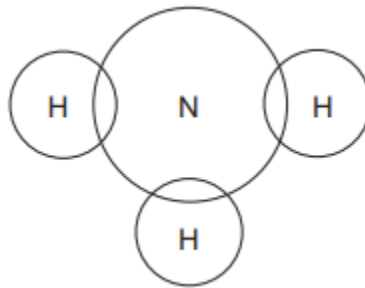
COVALENT BONDING 1

Q1. Hydrogen is used to make ammonia (NH_3).

Complete the diagram to show the bonding in ammonia.

Use dots (•) and crosses (x) to show electrons.

Show only outer shell electrons.

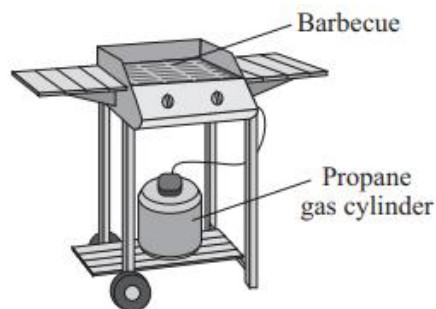


(2 marks)

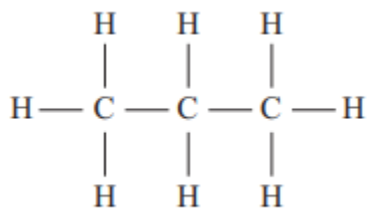
Q2. Carbon dioxide has a very low boiling point. Explain why.

(3 marks)

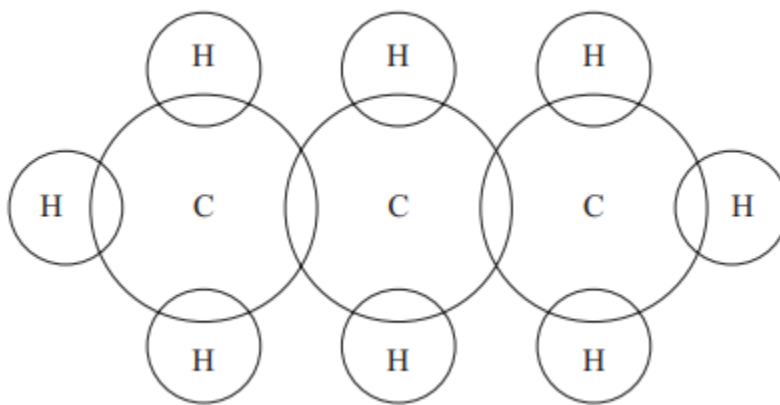
Q3. This barbecue burns propane gas.



The structure of propane is shown below.



(a) Complete the diagram to show how the outer energy level (shell) electrons of hydrogen and carbon are arranged in a molecule of propane.



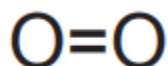
(1 mark)

(b) Explain, in terms of molecules, why propane has a low boiling point.

(2 marks)

Q4.

(a) The diagram represents the bonding in oxygen.



Draw a ring around the correct answer to complete each sentence

(i)

When two oxygen atoms bond, the atoms

| |
|------------|
| share |
| transfer |
| delocalise |

 electrons.

(1 mark)

(ii)

The oxygen atoms are joined by

| |
|----------|
| ionic |
| metallic |
| covalent |

 bonds.

(1 mark)

(iii)

Oxygen is made of

| |
|-------------------|
| simple molecules. |
| a giant lattice. |
| macromolecules. |

(1 mark)

(b) When hydrogen peroxide decomposes water is produced.

Which two statements in the table explain why water is a liquid at room temperature?

Tick (✓) the two statements.

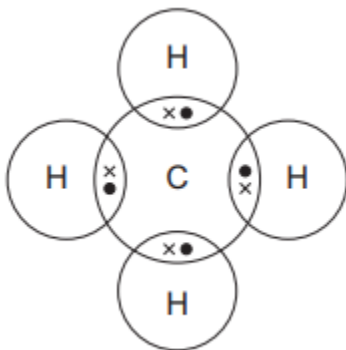
| Statement | Tick (✓) |
|--|----------|
| Water has a boiling point of 100 °C. | |
| Water is made of ions. | |
| Water has a melting point lower than room temperature. | |
| Water has a giant covalent structure. | |

(2 marks)

Q5. Methane gas is often found where crude oil is found.

(a) The diagram shows how atoms bond in methane.

Only the outer electrons are shown.



(i) Draw a ring around the correct answer to complete the sentence.

Methane is

| |
|-------------|
| a compound. |
| an element. |
| a mixture. |

(1 mark)

(ii) Draw a ring around the correct answer to complete the sentence.

The formula of methane is

| |
|----------|
| C_4H_4 |
| C_4H |
| CH_4 |

(1 mark)

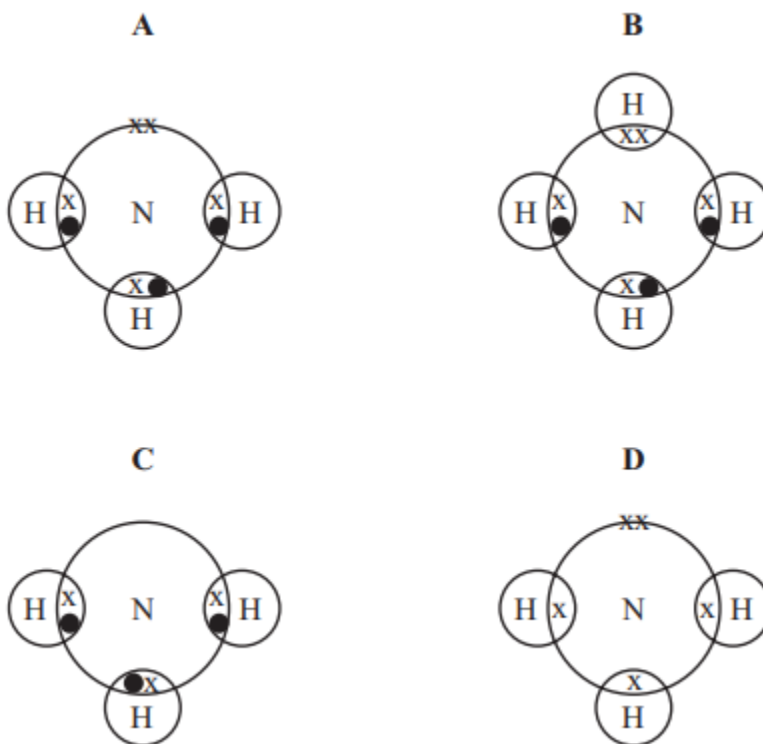
(iii) Name the type of bond between the carbon and hydrogen atoms in methane.

(1 mark)

(b) Explain why methane is a gas at 20°C.

(2 marks)

Q6. Nitrogen can react with hydrogen to make ammonia, NH_3 .

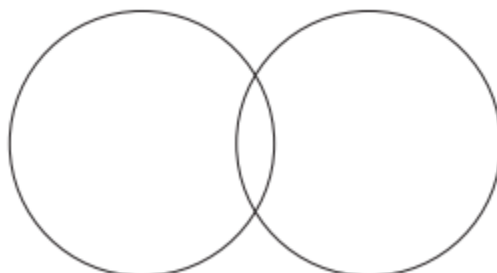


Which diagram, **A**, **B**, **C** or **D**, best represents an ammonia molecule?

(1 mark)

Q7. Sodium oxide is made by heating sodium metal in oxygen gas.

Complete the diagram to show the outer electrons in an oxygen molecule (O_2).



(2 marks)

Total marks (21)