IGCSE · Cambridge (CIE) · Chemistry

15 mins 15 questions

Multiple Choice Questions

# Simple Molecules & Covalent Bonds

Covalent Bonds / Molecules & Compounds / Properties of Simple Molecular Compounds

| | |
|---|---|
| Easy (5 questions) | /5 |
| Medium (5 questions) | /5 |
| Hard (5 questions) | /5 |
| **Total Marks** | **/15** |

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# Easy Questions

**1** Which of the following compounds are formed by covalent bonding?

| | |
|---|---|
| **1** | Potassium fluoride |
| **2** | Propane |
| **3** | Carbon dioxide |
| **4** | Lithium bromide |

**A.** 2 and 3

**B.** 2 and 4

**C.** 1, 2 and 3

**D.** 1 and 4

**(1 mark)**

**2** Which row correctly describes a simple covalent compound?


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| | low melting point | high boiling point |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | × | ✓ |
| **C** | × | × |
| **D** | ✓ | × |

**(1 mark)**

**3** Which statement about bonding is not correct?

**A.** Covalent bonding involves non metal elements.

**B.** Covalent bonding involves electron sharing.

**C.** Covalent bonding involves electron transfer.

**D.** Covalent bonding does not involve metal elements.

**(1 mark)**

**4** Ammonia is a covalent compound consisting of one nitrogen atom bonded to three hydrogen atoms.

Which statement is correct for a molecule of ammonia?

**A.** The number of shared pairs of electrons is five

**B.** The number of shared pairs of electrons is three

**C.** There are single covalent bonds between the hydrogen atoms.

**D.** Each hydrogen atom donates one pair of electrons to the central nitrogen atom.

**(1 mark)**


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## 5 Extended Only

The structure of propane is shown below

Which correctly explains why propane can not conduct electricity?

**A.** There are weak intermolecular forces between molecules of propane

**B.** The covalent bonds in propane are strong

**C.** There are no free electrons able to move and carry a charge

**D.** Propane has a low boiling point

**(1 mark)**


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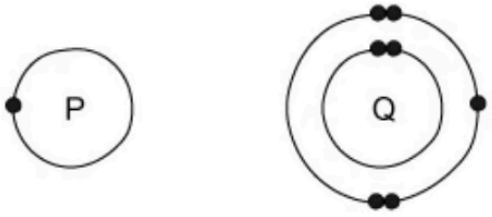
# Medium Questions

**1** Atoms P and Q have electronic structures as shown in the diagram. They react together to form a covalent compound.




What is the formula of the compound?

**A.** $P_2Q_3$

**B.** $P_3Q$

**C.** $P_3Q_2$

**D.** $PQ_4$

**(1 mark)**

**2** The atom of element Z has 6 electrons in its outer shell. How would this element react?

**A.** It shares two electrons with four from another atom to form two covalent bonds

**B.** It shares four electrons with four from another atom to form four covalent bonds

**C.** It shares four electrons with two from another atom to form two covalent bonds

**D.** It shares two electrons with two from another atom to form two covalent bonds

**(1 mark)**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**3** $CH_4$, $H_2O$ and HCl are covalent compounds.

Which atoms in these compounds do not use all of their outer shell electrons in bonding?

**A.** C and O

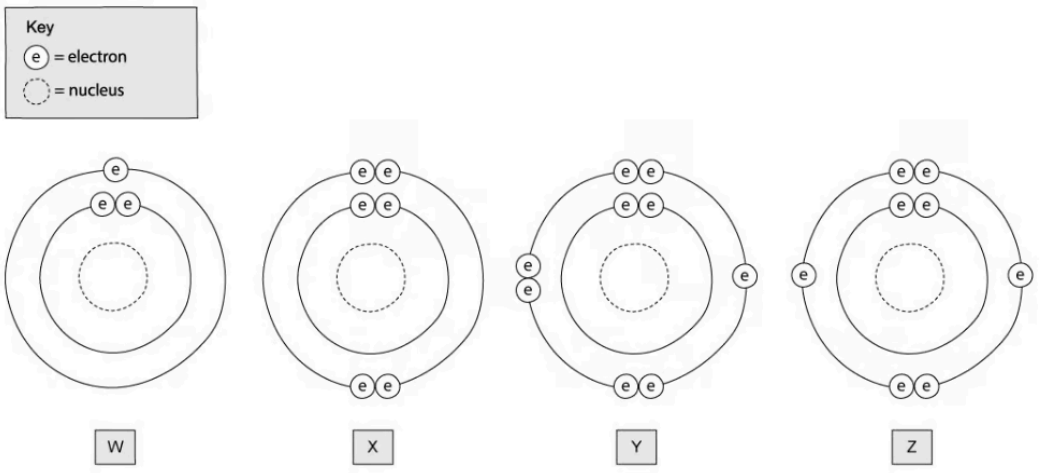
**B.** C and H

**C.** Cl and O

**D.** Cl and C

**(1 mark)**

**4** The electronic configurations of four different atoms are shown below.




Which atoms form covalent compounds?

**A.** W and X

**B.** W, X and Y

**C.** W and Z

**D.** X, Y and Z

**(1 mark)**

## 5 Extended Only

Which of the following molecules contains only single covalent bonds?

**A.** $N_2$

**B.** $F_2$

**C.** $O_2$

**D.** $CO_2$

**(1 mark)**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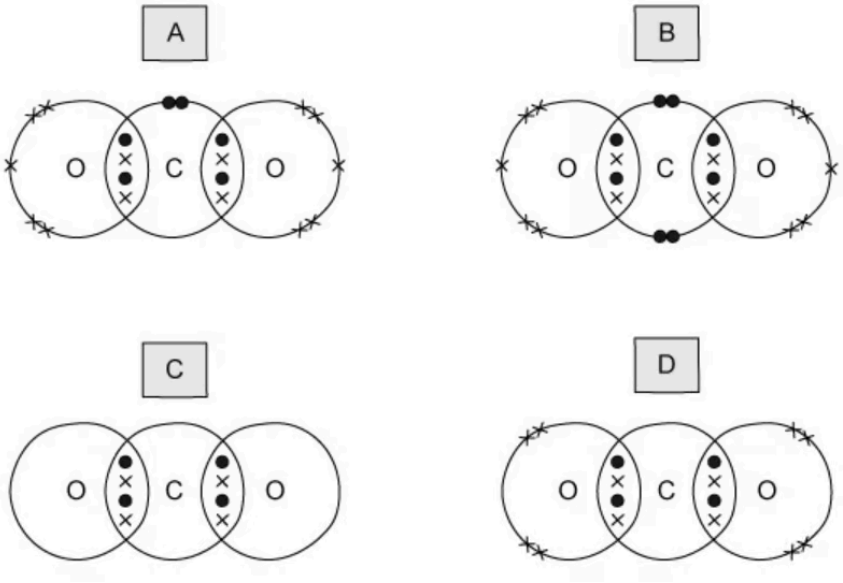
# Hard Questions

## 1 Extended Only

Carbon dioxide is a simple molecular substance in which the molecules are formed by covalent bonding between one carbon atom and two oxygen atoms.

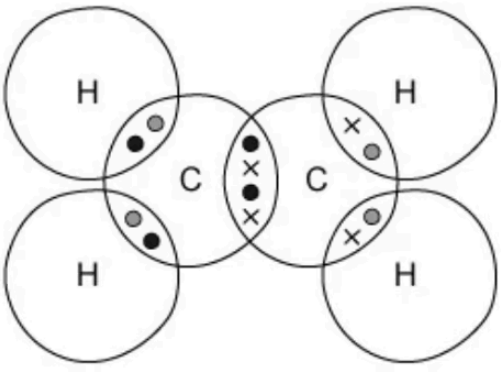
Which dot and cross diagram below shows the correct outer shell arrangement of electrons in a molecule of $CO_2$?




**(1 mark)**

## 2 Extended Only

A student has drawn a dot and cross diagram to represent a molecule of ethene, $C_2H_4$, as shown below.




What is wrong with the students drawing?

**A.** The number of electrons shared between the carbon atoms is incorrect.

**B.** The number of electrons shared between each carbon and hydrogen is incorrect.

**C.** There is nothing wrong with the drawing.

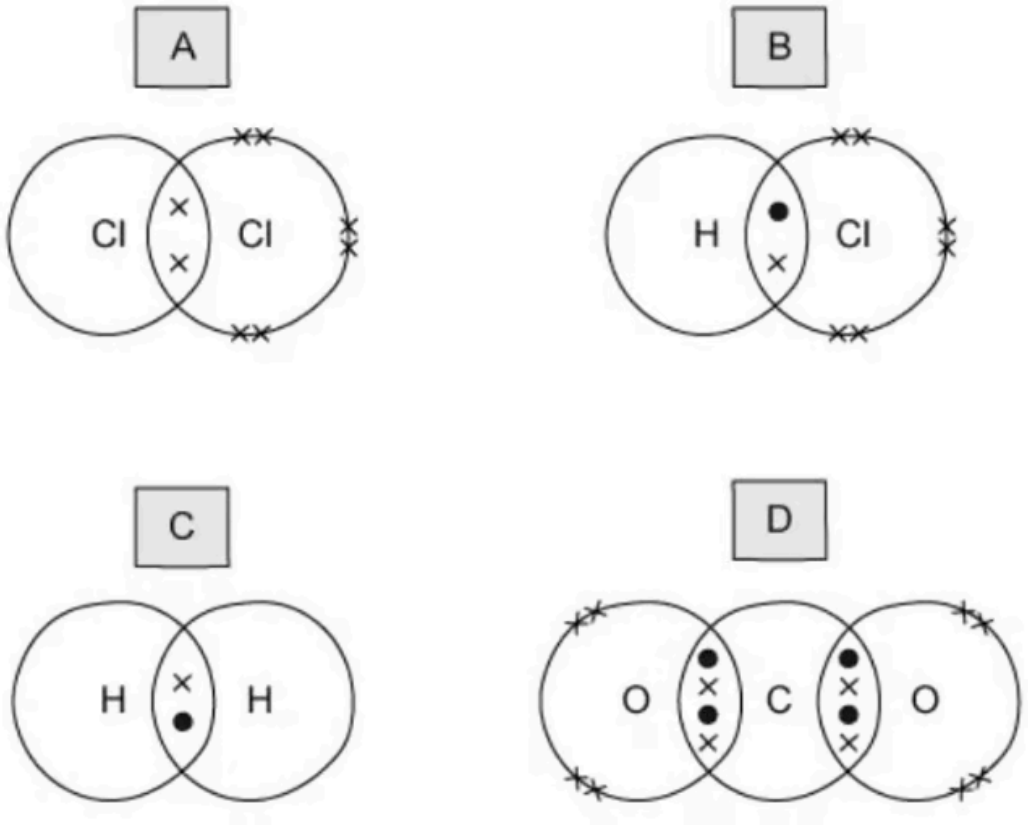
**D.** The total number of electrons shared is incorrect.

**(1 mark)**

## 3 Extended Only

Dot and cross diagrams for four covalent molecules are shown below.

Which diagram is incorrect?




**(1 mark)**

## 4 Extended Only

Which statement about methane is correct?

**A.** It has a high melting point due to strong covalent bonds between atoms

**B.** It has a low melting point due to weak covalent bonds between the molecules

**C.** It has a low boiling point due to weak intermolecular forces between molecules

**D.** It has a high boiling point because of strong intermolecular forces between molecules

**(1 mark)**

## 5 Extended Only

A covalent molecule M contains a total of four shared electrons.

What is M?

**A.** Carbon dioxide

**B.** Oxygen

**C.** Nitrogen

**D.** Methane

**(1 mark)**