

Bonding and Structure (MCQ)

1. Which molecule contains the largest bond angle?

- A C₂H₄
- B H₂O
- C NH₃
- D CH₄

Your answer

[1]

2. Which element has induced dipole–dipole interactions (London forces) in its solid lattice?

- A boron
- B magnesium
- C silicon
- D sulfur

Your answer

[1]

3. Which compound has polar molecules?

- A OC_l₂
- B BC_l₃
- C CC_l₄
- D SC_l₆

Your answer

[1]

4. Which element has the highest melting point?

- A silicon
- B phosphorus
- C sulfur
- D chlorine

Your answer

[1]

5. What is the best explanation for the trend in boiling points down the halogens group?

- A The covalent bonds become stronger.
- B The hydrogen bonds become stronger.
- C The permanent dipole–dipole interactions become stronger.
- D The induced dipole–dipole interactions (London forces) increase.

Your answer

[1]

6. A chemist determines some properties of two substances, **C** and **D**.

The results are shown in the table.

	C	D
Melting point / °C	660	801
Electrical conductivity when solid	Yes	No
Electrical conductivity when molten	Yes	Yes
Solubility in water	No	Yes

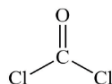
Which row correctly identifies the bonding and structure in **C** and **D**?

	C	D
A	giant ionic	giant metallic
B	giant ionic	giant ionic
C	giant metallic	giant metallic
D	giant metallic	giant ionic

Your answer

[1]

7. The diagram shows the bonds present in a molecule of COCl_2 .



What is the shape of a molecule of COCl_2 ?

- A. non-linear
- B. pyramidal
- C. tetrahedral
- D. trigonal planar

Your answer

[1]

8. Which molecule is polar?

- A. CH_4
- B. C_2H_4
- C. CH_3Cl
- D. CCl_4

Your answer

[1]

9. Predict the shape and bond angle in a molecule that has 2 bonding pairs and 2 lone pairs around a central atom.

- A. linear, 180°
- B. non-linear, 104.5°
- C. tetrahedral, 109.5°
- D. trigonal planar, 120°

Your answer

[1]

10. Which substance contains hydrogen bonding in the liquid state?

- A. $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$
- B. $\text{CH}_3(\text{CH}_2)_3\text{CHFCH}_3$
- C. $\text{CH}_3(\text{CH}_2)_3\text{COCH}_3$
- D. $\text{CH}_3(\text{CH}_2)_3\text{CH}(\text{OH})\text{CH}_3$

Your answer

[1]

11. Which molecule is non-polar?

- A. SF_6
- B. H_2S
- C. PF_3
- D. NH_3

Your answer

[1]

END OF QUESTION PAPER

Mark scheme – Bonding and Structure (MCQ)

Question			Answer/Indicative content	Marks	Guidance
1			A	1 (AO1.1)	<p>Examiner's Comments</p> <p>This part discriminated well, with most able candidates selecting the correct answer of A. A sizeable number selected B, accompanied by a diagram of an H₂O molecule with a 180° bond angle, presumably by ignoring the lone pairs. C₂H₄ was often shown with a bond angle of 109.5°, presumably as the C=C bond had not been identified, giving a bond angle of 120°.</p>
			Total	1	
2			D	1	<p>Examiner's Comments</p> <p>As is often the case, candidates find structure and bonding difficult. Many candidates selected silicon (C) instead of the correct response of sulfur (D).</p>
			Total	1	
3			A	1	<p>Examiner's Comments</p> <p>Surprisingly, less than half of candidates obtained the correct answer. Many candidates incorrectly chose answer option B, BCl₃, despite it having no lone pair.</p>
			Total	1	
4			A	1	<p>Examiner's Comments</p> <p>Most candidates correctly identified Si as giant covalent. A common error was answer option D.</p>
			Total	1	
5			D	1	<p>Examiner's Comments</p> <p>This part was generally well answered. The common incorrect answer was answer option A.</p>
			Total	1	

6			D	1	
			Total	1	
7			D	1	
			Total	1	
8			C	1	
			Total	1	
9			B	1	
			Total	1	
10			D	1	
			Total	1	
11			A	1	
			Total	1	