

# 4.3 Intermolecular Forces & Metallic Bonding

## Question Paper

Course	DPIB Chemistry
Section	4. Chemical Bonding & Structure
Topic	4.3 Intermolecular Forces & Metallic Bonding
Difficulty	Medium

**Time allowed:** 20  
**Score:** /10  
**Percentage:** /100

### Question 1

Which of the following metals would have the highest melting point?

- A. Na
- B. Mg
- C. Al
- D. K

[1 mark]

### Question 2

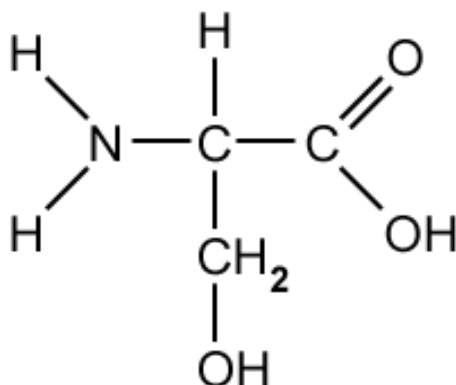
The correct order of increasing boiling points for the following compounds is

- A. 1-chlorobutane < butane < butan-1-ol
- B. Butan-1-ol < 1-chlorobutane < butane,
- C. Butane < 1-chlorobutane < butan-1-ol
- D. Butan-1-ol < butane < 1-chlorobutane

[1 mark]

### Question 3

What is the strongest type of intermolecular force exhibited in the amino acid molecule serine?



Serine

- A. London dispersion forces
- B. Permanent dipole permanent dipole forces
- C. Hydrogen bonding
- D. Covalent bonding

[1 mark]

### Question 4

Hexane, C<sub>6</sub>H<sub>14</sub> and 2,2-dimethylbutane, CH<sub>3</sub>C(CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>, are two isomers of one another and have the same M<sub>r</sub> of 86.0.

Hexane has a **higher** boiling point than 2,2-dimethylbutane.

Which of the following statements is **not** correct?

- A. hexane has a higher boiling point because it is a straight chain molecule
- B. 2,2-dimethylbutane has a lower boiling point as it is a branched molecule
- C. 2,2-dimethylbutane only contains London dispersion forces
- D. hexane contains permanent dipole permanent dipole forces

[1 mark]

### Question 5

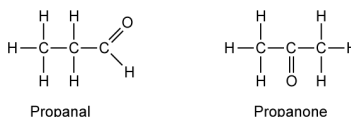
Which of the following substances has the highest melting point?

- A. Mg
- B. NaO
- C. O<sub>2</sub>
- D. C (graphite)

[1 mark]

### Question 6

Which of the following statements about propanal and propanone are correct?



- I. The strongest type of intermolecular force in both molecules is hydrogen bonding
- II. The strongest type of intermolecular force in both molecules is permanent dipole permanent dipole forces
- III. Both compounds are soluble in water

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]

### Question 7

Which molecule has the **lowest** boiling point?

- A. CH<sub>3</sub>CH<sub>2</sub>CHO
- B. CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Cl
- C. CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>
- D. CH<sub>3</sub>CH<sub>2</sub>COOH

[1 mark]

### Question 8

Which of the following species has the highest melting point?

- A.  $1s^2 2s^2 2p^6 3s^1$
- B.  $1s^2 2s^2 2p^6 3s^2$
- C.  $1s^2 2s^2 2p^6 3s^2 3p^1$
- D.  $1s^2 2s^2 2p^6 3s^2 3p^2$

[1 mark]

### Question 9

Which type of bonding can be described as 'the electrostatic attraction between positive nuclei and electrons and occurs by the sharing of electrons'?

- A. Hydrogen bonding
- B. Ionic bonding
- C. Metallic bonding
- D. Covalent bonding

[1 mark]

### Question 10

Which of the following statements about ammonia,  $\text{NH}_3$ , is **not** correct?

- A. The lone pair on nitrogen can form a coordinate bond
- B. The bond angle in the  $\text{NH}_3$  molecule is  $107^\circ$
- C. The strongest type of intermolecular force is hydrogen bonding
- D. There are four bonding pairs of electrons in the  $\text{NH}_3$  molecule

[1 mark]