4.3 Intermolecular Forces & Metallic Bonding

Question Paper

Course	DP IB 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,

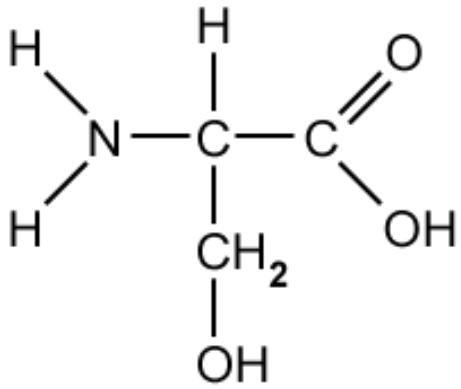
C. Butane < 1-chlorobutane < butan-1-ol

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_6H_{14} and 2,2–dimethylbutane, $CH_3C(CH_3)_2CH_2CH_3$, are two isomers of one another and have the same M_r 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

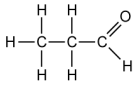
C. O_2

D. C (graphite)

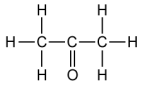
[1 mark]

Question 6

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



Propanal



Propanone

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_3CH_2CHO

B. $CH_3CH_2CH_2Cl$

C. $CH_3CH_2CH_3$

D. CH_3CH_2COOH

[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, NH_3, is **not** correct?

A. The lone pair on nitrogen can form a coordinate bond

B. The bond angle in the NH_3 molecule is 107°

C. The strongest type of intermolecular force is hydrogen bonding

D. There are four bonding pairs of electrons in the NH_3 molecule

[1 mark]