

# 4.1 Ionic & Covalent Bonding

## Question Paper

Course	DPIB Chemistry
Section	4. Chemical Bonding & Structure
Topic	4.1 Ionic & Covalent Bonding
Difficulty	Medium

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

### Question 1

Which of the following statements about 2-methylpropan-2-ol,  $\text{CH}_3\text{C}(\text{CH}_3)(\text{OH})\text{CH}_3$ , are correct?

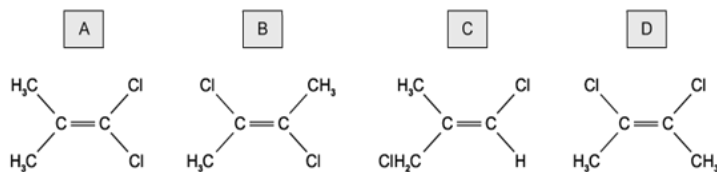
- I. The structure contains 16 bonding pair of electrons
- II. The O-C-C bond angle is  $109.5^\circ$
- III. The total number of electrons is 32

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

[1 mark]

### Question 2

Which of the following molecules has the biggest overall dipole?



[1 mark]

### Question 3

The electronegativity of four elements are given below

$$\text{N} = 3.0 \quad \text{H} = 2.1 \quad \text{F} = 4.0 \quad \text{P} = 2.1$$

What is the correct order of polarity for the following compounds

- A.  $\text{PH}_3 < \text{PF}_3 < \text{NF}_3 < \text{NH}_3$
- B.  $\text{PH}_3 < \text{PF}_3 < \text{NH}_3 < \text{NF}_3$
- C.  $\text{NF}_3 < \text{NH}_3 < \text{PH}_3 < \text{PF}_3$
- D.  $\text{PH}_3 < \text{NH}_3 < \text{NF}_3 < \text{PF}_3$

[1 mark]

### Question 4

Which of the following compounds has both covalent and ionic bonds?

- A. calcium bromide,  $\text{CaBr}_2$
- B. potassium carbonate,  $\text{K}_2\text{CO}_3$
- C. propanoic acid,  $\text{CH}_3\text{CH}_2\text{COOH}$
- D. dichloromethane,  $\text{CH}_2\text{Cl}_2$

[1 mark]

### Question 5

Which is the best description of ionic bonding?

- A. electrostatic attraction between cations and electrons
- B. electrostatic attraction between nuclei
- C. electrostatic attraction between oppositely charged ions
- D. electrostatic attraction of nuclei towards shared electrons in the bond between the nuclei

[1 mark]

### Question 6

Below are four molecules. Which is the **most** polar molecule present?

- A.  $\text{CH}_3\text{NH}_2$
- B.  $\text{CH}_4$
- C.  $\text{CCl}_4$
- D.  $\text{CO}_2$

[1 mark]

### Question 7

Potassium bromide is an ionic compound.

When can potassium bromide conduct electricity?

	Solid	Molten	Aqueous
A	✓	✓	x
B	✓	x	✓
C	x	✓	✓
D	x	x	✓

- A.
- B.
- C.
- D.

[1 mark]

### Question 8

A periodic table is needed to answer this question.

Of the four compounds listed below which one has the greatest ionic character?

- A. HCl
- B. MgS
- C. CO<sub>2</sub>
- D. CaO

[1 mark]

### Question 9

What is the correct formula for aluminium sulfate?

- A. Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>
- B. Al(SO<sub>4</sub>)<sub>2</sub>
- C. Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>
- D. AlSO<sub>4</sub>

[1 mark]

**Question 10**

Aluminium iodide,  $Al_2I_6$  is a dimer and exists as a solid at room temperature. When it is a vapour it can exist as an  $AlI_3$  molecule.

How many valence electrons are in an aluminium iodide,  $AlI_3$ , molecule?

- A. 22
- B. 24
- C. 26
- D. 28

[1 mark]