

# 4.1 Ionic & Covalent Bonding

## Question Paper

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

**Time allowed:** 20  
**Score:** /12  
**Percentage:** /100

### Question 1

Phosphine,  $\text{PH}_3$ , can react with a hydrogen ion,  $\text{H}^+$ , to form the phosphonium ion.

Which type of bond is formed in this reaction?

- A. dipole-dipole forces
- B. dative covalent bond
- C. ionic bond
- D. hydrogen bond

[1 mark]

### Question 2

Silver and iodine are both shiny crystalline solids.

Which forces exist between neighbouring iodine molecules in solid iodine and particles in solid silver?

	iodine	silver
A	metallic bonds	covalent bonds
B	ionic bonds	metallic
C	covalent bonds	covalent bonds
D	London dispersion forces	metallic

[1 mark]

### Question 3

Below are four solids. Which of these contains more than one kind of bonding?

- A. diamond
- B. sodium chloride
- C. iron
- D. ice

[1 mark]

### Question 4

Which of the following statements about ions and ionic compounds are true?

- I. Nitrogen can form a  $3^-$  ion
- II. Potassium can form a cation
- III. The formula for aluminium chloride is  $AlCl_2$

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

[1 mark]

### Question 5

What is the correct formula for ammonium carbonate?

- A.  $NH_3CO_3$
- B.  $NH_4CO_3$
- C.  $(NH_4)_2CO_3$
- D.  $(NH_4)_3CO_3$

[1 mark]

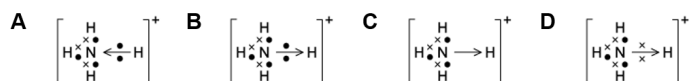
### Question 6

In acidic conditions, ammonia,  $NH_3$ , reacts with a proton,  $H^+$ , to form ammonium  $NH_4^+$ .

Using the following key:

- N electron
- × H electron

Which of the following Dot & Cross diagrams correctly illustrate electron movement in this reaction.



[1 mark]

### Question 7

Which crystal structure does not conduct electricity when solid, has a high melting point and can conduct electricity when molten?

- A. Giant metallic
- B. Giant ionic
- C. Macromolecular
- D. Simple molecular

[1 mark]

### Question 8

Which of these atoms is most electronegative?

- A. Cl
- B. Mg
- C. Br
- D. Na

[1 mark]

### Question 9

Which of the following compounds is **not** bonded ionically?

- A.  $\text{CaCO}_3$
- B.  $\text{CH}_3\text{OH}$
- C.  $\text{NaOH}$
- D.  $\text{BaCl}_2$

[1 mark]

### Question 10

“Electrostatic attraction between cations and delocalised electrons”

Which of the following types of bonds does the statement best describe?

- A. hydrogen
- B. ionic
- C. dipole-dipole
- D. metallic

[1 mark]

### Question 11

Which of the following materials only contain one type of bonding?

- A. graphite
- B. brass
- C. ice
- D. iodine crystals

[1 mark]

### Question 12

Based on their Pauling electronegativity values, which atom is more likely to form a **covalent** bond with fluorine?

	atom	Pauling value
	fluorine	4.0
<b>A</b>	hydrogen	2.2
<b>B</b>	copper	1.9
<b>C</b>	magnesium	1.3
<b>D</b>	potassium	0.8

[1 mark]