

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: 30
Score: /21
Percentage: /100

Question 1a

Describe the nature of ionic bonding.

[1 mark]

Question 1b

State the type of bonding in potassium chloride which melts at 1043 K.

[1 mark]

Question 1c

Describe the structure and bonding in solid magnesium oxide.

[2 marks]

Question 1d

Outline why solid magnesium chloride does not conduct electricity.

[1 mark]

Question 2a

Predict whether phosphorus(V) oxide and sodium oxide conduct electricity in their solid and molten states. Complete the boxes with "yes" or "no".

	Phosphorus(V) oxide	Sodium oxide
Solid state		
Molten state		

[2 marks]

Question 2b

State the formula of the compounds formed between the elements below.

- i) Sodium and sulfur:
- ii) Magnesium and phosphorus:

[2 marks]

Question 2c

Describe the covalent bond present in a chlorine molecule and how it is formed.

[2 marks]

Question 2d

Draw the Lewis (electron dot) structure of chloromethane.

[1 mark]

Question 3a

Using section 8 of the data booklet to state which of the following single covalent bonds is the most polar.

C-O

C-H

O-H

[1 mark]

Question 3b

Using section 10 of the data booklet, list the following molecules in order of increasing bond length between the carbon atoms.

C₂H₆

C₂H₄

C₂H₂

[1 mark]

Question 3c

Using section 11 of the data booklet, list the following molecules in order of decreasing bond strength between the carbon atoms.

**[1 mark]****Question 3d**

CO contains three covalent bonds, one of which is a coordinate bond.

Describe how a coordinate bond arises in CO.

[1 mark]**Question 4a**

Calcium nitrate contains both covalent and ionic bonds.

State the formula of both ions present and the nature of the force between these ions.

[2 marks]**Question 4b**

State the formula of the compound that boron forms with chlorine.

[1 mark]**Question 4c**

Draw the Lewis structure for boron chloride.

[1 mark]

Question 4d

Explain why boron trichloride is able to form coordinate (covalent) bonds with other molecules.

[1 mark]