4.1 Ionic & Covalent Bonding

Question Paper

Course	DP IB 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.

C_2H_6 C_2H_4 C_2H_2

[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.

C_2H_6 C_2H_4 C_2H_2

[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]