4.1 Ionic & Covalent Bonding

Question Paper

Course	DP IB Chemistry
Section	4. Chemical Bonding & Structure
Topic	4.1 Ionic & Covalent Bonding
Difficulty	Hard

Time allowed: 20

Score: /10

Percentage: /100

Question 1

$CHCl_3$ and Br_2 are both liquids at room temperature due to the existence of dipoles.

What dipoles are involved within $CHCl_3$ and Br_2?

	$CHCl_3$	Br_2
A	induced dipoles only	induced dipoles only
B	induced dipoles only	induced dipoles and permanent dipoles
C	induced dipoles and permanent dipoles	induced dipoles and permanent dipoles
D	induced dipoles and permanent dipoles	induced dipoles only

[1 mark]

Question 2

What are the correct formulas for the following ions?

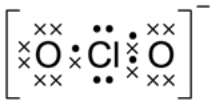
	Phosphate	Ammonium	Ethanoate	Nitrite
A	PO_4^{3-}	NH_4^+	CH_3COO^+	NO_3^-
B	PO_3^{2-}	NH_4^-	CH_3COO^-	NO_2^-
C	PO_4^{3-}	NH_4^+	CH_3COO^-	NO_2^-
D	PO_4^{2-}	NH_4^+	$CH_3CH_2COO^-$	NO_3^-

[1 mark]

Question 3

What is the correct structure of the chlorite ion, ClO_2^- ?

A



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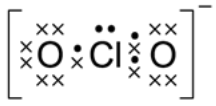

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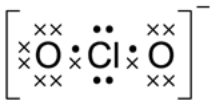

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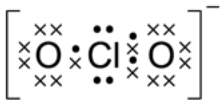


[1 mark]

Question 4

Which of the following statements about 2-chloropropene, $CH_2C(Cl)CH_3$ is **not** correct

A. There are 3 lone pairs in the molecule

B. There are 24 valence electrons in the molecule

C. The molecule does obey the octet rule

D. The molecule does not obey the octet rule

[1 mark]

Question 5

Which of the following structures do **not** obey the octet rule?

I. $BeCl_2$
II. BF_3
III. H_2O

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 6

The periodic table may be needed to answer this question.

Which is the shortest bond length in the following gases?

A. oxygen-oxygen in oxygen gas, O_2

B. carbon-carbon in ethyne gas, C_2H_2

C. nitrogen-nitrogen in nitrogen gas, N_2

D. oxygen-oxygen in ozone gas, O_3

[1 mark]

Question 7

Which statement best describes the **intramolecular** bonding in a carbonate ion, CO_3^{2-}?

A. Only London forces

B. Electrostatic attraction between pairs of electrons and positively charged nuclei

C. Permanent dipole permanent dipole forces

D. Electrostatic attraction between separate carbonate ions

[1 mark]

Question 8

The number of electrons in the valence shell of elements X and Y are 5 and 7 respectively. What is the formula and type of compound formed from these elements?

A. Covalent, XY_3

B. Ionic, XY_3

C. Covalent, X_3Y

D. Ionic, X_3Y

[1 mark]

Question 9

The nitrate(V) ion, NO_3^-, is a polyatomic ion, bonded by covalent bonds.

Which of the following shows the correct displayed formula for the nitrate ion?

Question 10

In which series of compounds does covalent character increase when going from left to right?

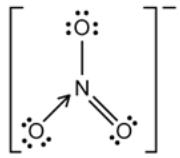
A. KI, KBr, KCl

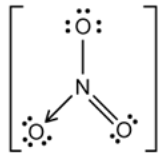
B. NaI, KI, RbI

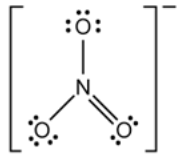
C. NaCl, $MgCl_2$, $AlCl_3$

D. SO_2, P_4O_{10}, SiO_2

[1 mark][1 mark]

A 

B 

C 

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