Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1

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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

This question is about the element iodine and its compounds.

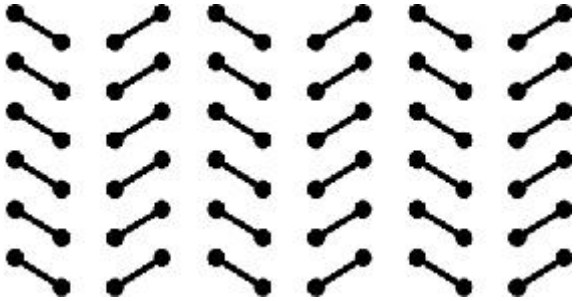
(a) Iodine is in Group 7 of the Periodic Table.

Complete the electron configuration of an iodine atom.

[Kr] _____

(1)

(b) Part of the structure of an iodine crystal is shown in the diagram.



Use your knowledge of structure and bonding to explain why the melting point of iodine is low (113.5 °C) and why that of hydrogen iodide is very low (–50.8 °C).

(6)

(c) State why iodine does **not** conduct electricity.

_____

_____

_____

(1)

(d) Deduce an equation for the formation of hydrogen iodide from its elements.

_____

(1)

(e) The triiodide ion is formed when an iodine molecule is bonded to an iodide ion.

What is the formula of ammonium triiodide?

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Tick (✔) **one** box.

NH_3I_3 ☐

NH_3I_4 ☐

NH_4I ☐

NH_4I_3 ☐

(1)

(f) Draw the shape of the IF_3 molecule and the shape of the IF_4^- ion.
Include any lone pairs of electrons that influence each shape.

(2)

(g) Deduce the oxidation state of iodine in the following species.

$Ba(IO_3)_2$ _____

$[H_4IO_6]^-$ _____

(2)

(Total 14 marks)

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Q2.

(a) Explain how the electron pair repulsion theory can be used to deduce the shape of, and the bond angle in, PF_3

(6)

(b) State the full electron configuration of a cobalt(II) ion.

(1)

(c) Suggest **one** reason why electron pair repulsion theory **cannot** be used to predict the shape of the $[CoCl_4]^{2-}$ ion.

(1)

(d) Predict the shape of, and the bond angle in, the complex rhodium ion $[RhCl_4]^{2-}$.

Shape _____

Bond angle _____

(2)

(Total 10 marks)

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