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# CHEMISTRY

## PHYSICAL CHEMISTRY

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|---|---|
| **LEVEL & BOARD:** | OCR (A - LEVEL) |
| **TOPIC:** | Compounds, Formulae & Equations |
| **PAPER TYPE:** | QUESTION PAPER 4 |
| **TOTAL QUESTIONS** | 07 |
| **TOTAL MARKS** | 17 |

# Compounds, Formulae and Equations

**1.** Iodine, with an atomic number of 53, is in Period 5 of the Periodic Table. Iodine is a Group 17 element.
Predict the formula of an iodide ion.

**[1]**

**2.** This question is about compounds of Group 2 elements.
Radium will combine directly with oxygen.
Write the equation for the reaction between Radium and oxygen.

**[1]**

**3.** A molecule of an alkene has 22 carbon atoms. State the empirical formula of this alkene.

**[1]**

**4.** Chlorine and mercury react with many elements and compounds.
Predict the formula of the compound formed when chlorine reacts with aluminum.

**[1]**

**5.** This question is about inorganic compound

**(a)** Silver chloride, AgCl, is exposed to sunlight. A student places a sample of AgCl in direct sunlight for an experiment.

**i.** Describe what the student would observe during this reaction.

**[1]**

**ii.** Write the equation for the reaction that occurs when AgCl is exposed to sunlight.

**[1]**

**(b)** Compounds of magnesium have various applications.

**i.** Identify a compound of magnesium that could be used to neutralize an acidic stomach with a pH of 4.0 to a pH of 6.5 and constipation.

**[1]**

**ii.** Magnesium sulfide, MgO, is an ionic compound used in specific applications.

Magnesium oxide can be synthesized by reacting magnesium metal with sulfur dioxide and $SO_2$.

Write the balanced chemical equation for the reaction of magnesium with sulfur dioxide to produce magnesium oxide and $S_8$.

**[1]**

**iii.** Draw a 'dot-and-cross' diagram to depict the bonding in magnesium Oxide, MgO.

Show only the outer electrons.

**[2]**

**6.** A salt used as a fertilizer has the empirical formula $Mg_3(PO_4)_2$.
Suggest the formulae of the ions present in this salt.

**[2]**

**7.** A chemist carries out reactions of strontium and strontium nitride, $Sr_3N_2$.

Reaction 1: Strontium is reacted with water.
Reaction 2: Strontium nitride is reacted with water, forming an alkaline solution and an alkaline gas.
Reaction 3: Strontium reacts with an excess chlorine gas at 500°C, forming strontium chloride, $SrCl_2$.

**i.** Write equations for Reaction 1 and Reaction 2.

**[3]**

**ii.** Predict the structure and bonding of $Sr_3N_2$.

**[1]**

**iii.** $SrCl_2$ formed in Reaction 3 contains strontium and chloride ions. Suggest a 'dot-and-cross' diagram for $SrCl_2$.

Show outer shell electrons only.

**[1]**

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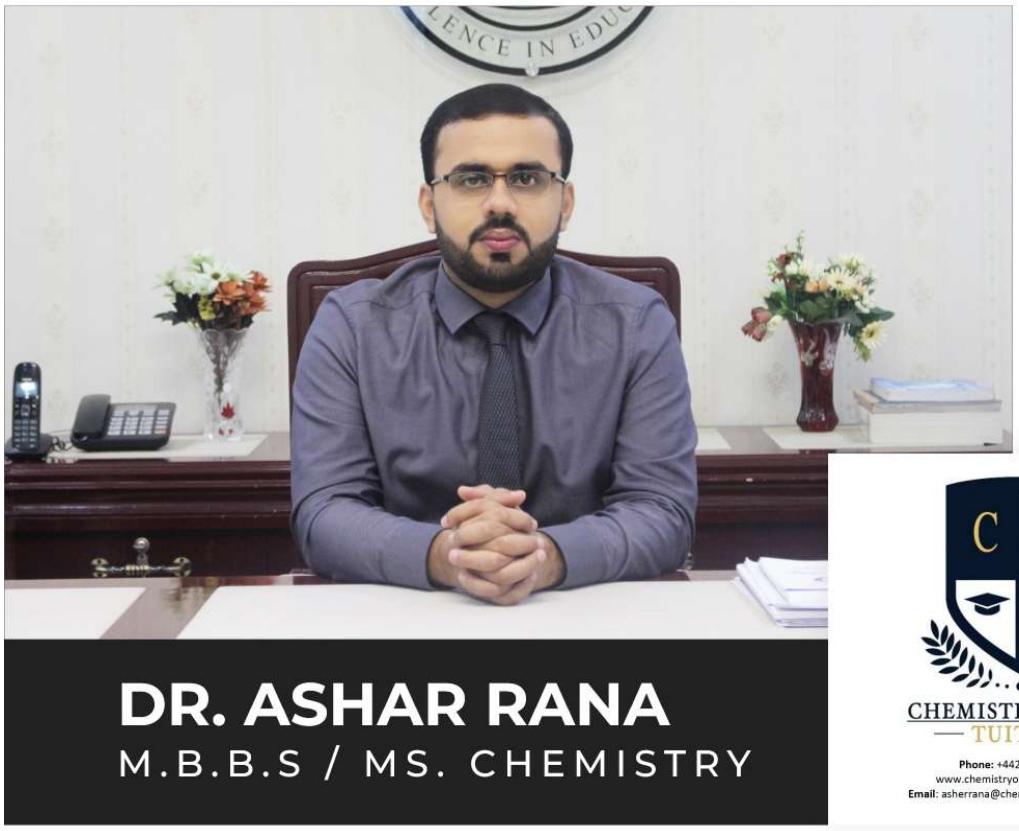

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