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## **CHEMISTRY**

## PHYSICAL CHEMISTRY

LEVEL & BOARD:	OCR (A - LEVEL)
TOPIC:	Atoms, Amount, Equation & Reactions
PAPER TYPE:	QUESTION PAPER 1
TOTAL QUESTIONS	07
TOTAL MARKS	17

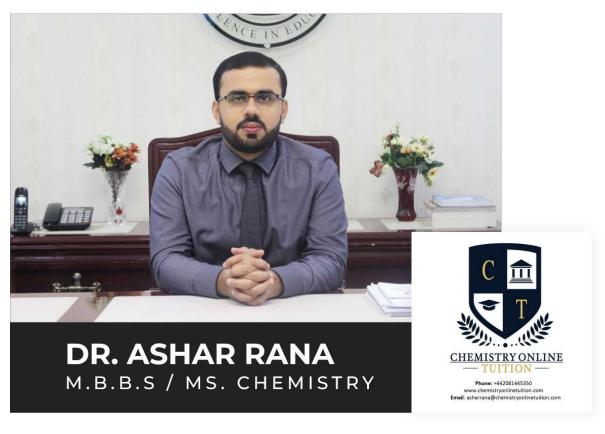
## **Compounds, Formulae, and Equations**

1.	Indium, atomic number 24, is in Period 4 of the Periodic Table.  Indium is a Group 3 element. Predict the formula of a Indium ion.	
2.	A che	[1] emist carries out reactions of magnesium and magnesium oxide, MgO.
	Reac wate Reac	tion 1: Magnesium is reacted with water. tion 2: Magnesium oxide is reacted with hydrochloric acid, forming a salt, r. tion 3: Magnesium is reacted with an excess of nitrogen at $800^{\circ}$ C, forming nesium nitride, $Mg_3N_2$ .
	i.	Write equations for Reaction 1 and Reaction 2.
		[3]
	ii.	Predict the structure and bonding of Mg <sub>3</sub> N <sub>2</sub> .
		[1]
	iii.	MgO formed in Reaction 3 contains magnesium and oxide ions. The oxide ion has the structure $[O]^{2-}$ .
		Suggest a 'dot-and-cross' diagram for MgO. Show outer shell electrons only.

			[1]
3.		ne and aluminum react with many elements and compounds.  It the formula of the compound formed when chlorine reacts wounds.  In the formula of the compound formed when chlorine reacts wounds.	ith
			[1]
4.	This	uestion is about inorganic compound	
	re	ad chloride, $PbCl_2$ , reacts with concentrated sulfuric acid. A stude acts a sample of $PbCl_2$ with an excess of concentrated sulfuric acid in st-tube.	
	i.	Describe what the student would observe during this reaction.	
			[1]
	ii.	Write the equation for the reaction between $PbCO_3$ and concentratinitric acid.	

	[1]
(b)	Compounds of potassium have many uses.
i.	Identify a compound of potassium that could be used as a fire suppressant.
	[1]
ii.	Potassium sulfide, $K_2S$ , is an ionic compound used in wastewater treatment. Potassium sulfide can be prepared by reacting potassium metal with sulfur, $S_8$ .  Write the equation for the reaction of potassium with sulfur to form potassium sulfide.
	[1]
iii.	Draw a 'dot-and-cross' diagram to show the bonding in potassium sulfide, $K_2S$ .
	Show outer electrons only.

5.	This question is about compounds of Group 5 elements. Phosphorus will combine directly with chlorine.
	Write the equation for the reaction between phosphorus and chlorine.
	[1]
6.	A molecule of an alkene has 12 carbon atoms. State the empirical formulae of this alkene.
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	[1]
7.	A salt used as a food preservative has the empirical formula $Na_3C_6H_5O_7$ . Suggest the formulae of the ions present in this salt.
	[2]



- · Founder & CEO of Chemistry Online Tuition Ltd.
- · Completed Medicine (M.B.B.S) in 2007
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