



**CHEMISTRY ONLINE**  
— **TUITION** —

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# CHEMISTRY

## PHYSICAL CHEMISTRY

<b>LEVEL &amp; BOARD:</b>	OCR (AS - LEVEL)
<b>TOPIC:</b>	Atoms, Amount, Equation & Reactions
<b>PAPER TYPE:</b>	QUESTION PAPER 3
<b>TOTAL QUESTIONS</b>	07
<b>TOTAL MARKS</b>	17

## Compounds, Formulae and Equations

1. This question is about compounds of Group 3 elements.  
Scandium will combine directly with oxygen.

Write the equation for the reaction between scandium and oxygen.

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[1]

2. A molecule of an alkane has 19 carbon atoms. State the empirical formula of this alkane.

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[1]

3. A salt used as a fertilizer has the empirical formula  $K_2SO_4$ .  
Suggest the formulae of the ions present in this salt.

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[2]

4. A chemist carries out reactions of potassium and potassium nitride,  $K_3N$ .

Reaction 1: Potassium is reacted with water.

Reaction 2: Potassium reacts with nitrogen, forming potassium nitrate.

Reaction 3: Potassium is reacted with an excess of oxygen at  $500^\circ\text{C}$ , forming potassium peroxide,  $K_2O_2$ .

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

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[3]

**ii.** Predict the structure and bonding of  $K_3N$ .

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[1]

**iii.**  $K_2O_2$  formed in Reaction 3 contains potassium and peroxide ions.

The peroxide ion has the structure  $[O-O]^{2-}$ .  
Suggest a 'dot-and-cross' diagram for  $K_2O_2$ .  
Show outer shell electrons only.

  
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[1]

**5.** Bromine and potassium react with many elements and compounds.

Predict the formula of the compound formed when bromine reacts with potassium.

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[1]

6. This question is about inorganic compound.

(a) Barium hydroxide,  $\text{Ba}(\text{OH})_2$ , reacts with Sulfuric acid in a test-tube.

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

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ii. Write the equation for the reaction between  $\text{Ba}(\text{OH})_2$  and dilute sulfuric acid.

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(b) Compounds of magnesium have many uses.

i. Identify a compound of magnesium that could be used to treat acidity in soil.

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[1]

ii. Strontium sulfide,  $\text{SrS}$ , is an ionic compound used in fireworks. Strontium sulfide can be prepared by reacting strontium metal with sulfur,  $\text{S}_8$ .

Write the equation for the reaction of strontium with sulfur to form strontium sulfide.

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[1]

- iii. Draw a 'dot-and-cross' diagram to show the bonding in strontium sulfide, SrS. Show outer electrons only.

[2]

7. Sodium, with an atomic number of 11, is in Period 3 of the Periodic Table. Sodium is a Group 1 element.

Predict the formula of a sodium ion.

[1]

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