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CHEMISTRY

PHYSICAL CHEMISTRY

LEVEL & BOARD:	OCR (A - LEVEL)
TOPIC:	Atoms, Amount, Equation & Reactions
PAPER TYPE:	QUESTION PAPER 3
TOTAL QUESTIONS	07
TOTAL MARKS	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°C , forming potassium peroxide, K_2O_2 .

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

[3]

ii. Predict the structure and bonding of K_3N .

[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.

[1]

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

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

[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.

[1]

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

[1]

(b) Compounds of magnesium have many uses.

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

[1]

ii. Strontium sulfide, SrS , is an ionic compound used in fireworks. Strontium sulfide can be prepared by reacting strontium metal with sulfur, S_8 .

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

[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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