



CHEMISTRY ONLINE
— **TUITION** —

Phone: +442081445350

www.chemistryonlinetuition.com

Email: asherrana@chemistryonlinetuition.com

CHEMISTRY

INORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	PROPERTIES OF PERIOD 3 ELEMENTS
PAPER TYPE:	QUESTION PAPER - 4
TOTAL QUESTIONS	10
TOTAL MARKS	33

ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.

Properties of Period 3 Elements and their Oxides

1. Explain why the melting point of sulfur (S_8) is greater than that of phosphorus (P_4).

(2)

2. Aluminium oxide is amphoteric. It reacts with acids and alkalis.

(a) Write an equation for the reaction between aluminium oxide and hydrochloric acid.

(1)

(b) Write an equation for the reaction between aluminium oxide and an excess of aqueous sodium hydroxide.

(1)

(c) Silicon dioxide does not react with hydrochloric acid but it does react with sodium hydroxide.

State one property of silicon dioxide that can be deduced from this information and write an equation for its reaction with sodium hydroxide.

(2)

3. This question is about the chemistry of the Period 3 elements and the trends in their properties.

Describe what you would observe when sulfur burns in oxygen.

Write an equation for the reaction that occurs.

State the type of bonding in the oxide formed.

(4)

4. This question is about elements in Period 3 and their compounds.

(a) When a piece of sodium is added to 200 cm³ of water in a large beaker a vigorous reaction occurs.

The temperature of the water increases by 25 °C Give an equation, including state symbols, for the reaction of sodium with water.

Suggest why it is dangerous to react a similar piece of sodium with 10 cm³ of water in a boiling tube.

(2)

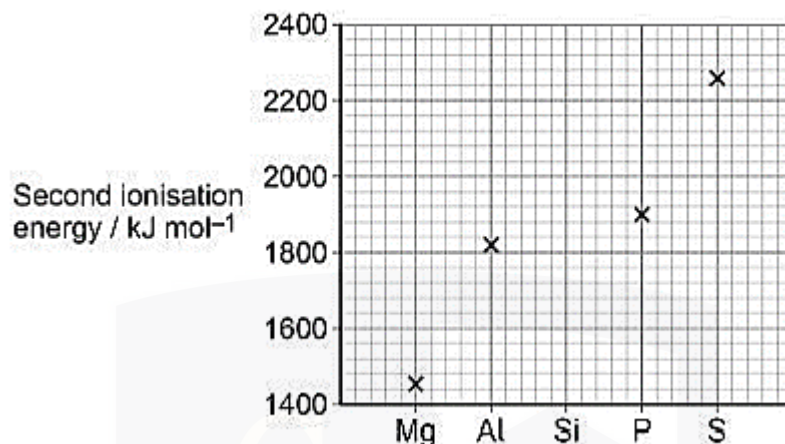
(b) Give an equation for the reaction of phosphorus(V) oxide with water. Suggest a pH for the solution formed.

(2)

5. This question is about Period 3 elements.

The graph shows the second ionisation energies of some elements in Period 3.

I am Sorry !!!!!



(a) Draw a cross (x) on the graph above to show the second ionisation energy of silicon.

(1)

(b) Identify the element in Period 3, from sodium to argon, that has the highest second ionisation energy.

Give an equation, including state symbols, to show the process that occurs when the second ionisation energy of this element is measured.

If you were unable to identify the element you may use the symbol Q in your equation.

(2)

6. State the type of bonding in sodium oxide.

Explain why sodium oxide reacts to form an alkaline solution when added to water.

(3)

7. This question is about oxides.

(a) Sodium oxide forms a solution with a higher pH than magnesium oxide when equal amounts, in moles, of each oxide are added separately to equal volumes of water.

State why both oxides form alkaline solutions.

Suggest why sodium oxide forms a solution with a higher pH than the solution formed from magnesium oxide.

(2)

(b) Give an equation for the reaction between phosphorus(V) oxide and water.

(1)

(c) In the Contact process, sulfur(IV) oxide is converted into sulfur(VI) oxide using vanadium(V) oxide as a catalyst.

Give two equations to show how the vanadium(V) oxide acts as a catalyst in this process.

(2)

8. This question is about the elements in Period 3 from sodium to phosphorus (Na to P) and their oxides.

Element X forms an oxide that has a low melting point.
This oxide dissolves in water to form an acidic solution.

(a) Deduce the type of bonding in this oxide of X.

(1)

(b) Identify element X.

(1)

(c) Write an equation for the reaction between this oxide of X and water.

(1)

9. A sample of the highest oxide of phosphorus was prepared in a laboratory.
Describe a method for determining the melting point of the sample.
State how the result obtained could be used to evaluate its purity.

(3)

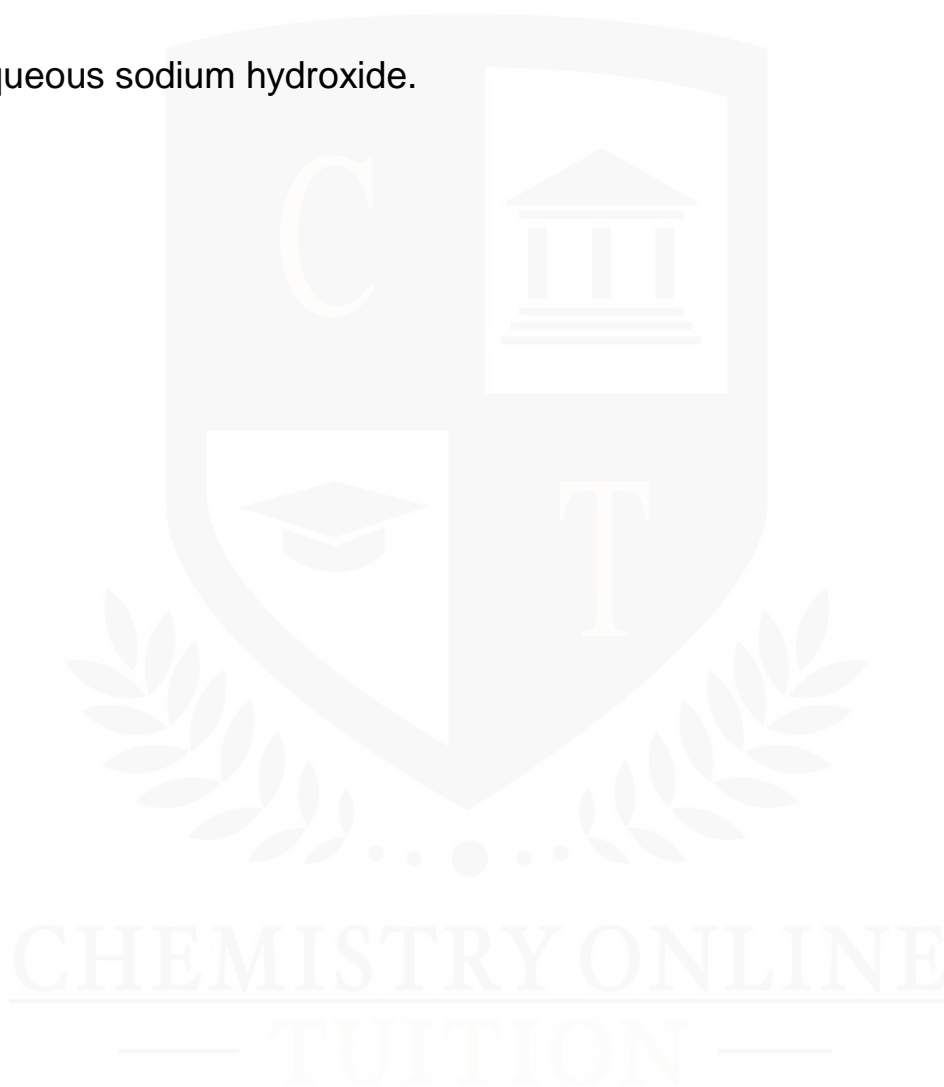
10. Write an ionic equation in each case to show how aluminium oxide reacts with the following

(a) hydrochloric acid

(1)

(b) aqueous sodium hydroxide.

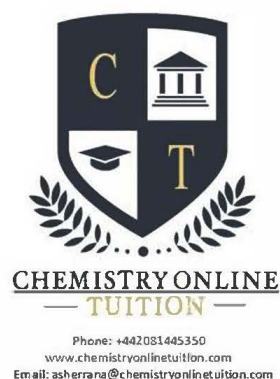
(1)



I am Sorry !!!!!



DR. ASHAR RANA



- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, and Math's Tutor

CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: www.chemistryonlinetuition.com
- Email: asherrana@chemistryonlinetuition.com
- Address: 210-Old Brompton Road, London SW5 OBS, UK