

Q1.

Which element is classified as a d block element?

- A Antimony
- B Molybdenum
- C Strontium
- D Uranium

(Total 1 mark)**Q2.**

Which element in Period 3 has the highest melting point?

- A Aluminium
- B Silicon
- C Sodium
- D Sulfur

(Total 1 mark)**Q3.**

Which ion has the largest radius?

- A F^-
- B Mg^{2+}
- C Na^+
- D O^{2-}

(Total 1 mark)

Q4.

Which element has a first ionisation energy lower than that of sulfur?

- A Chlorine
- B Oxygen
- C Phosphorus
- D Selenium

(Total 1 mark)

Q5.

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.

Equation

Why it is dangerous _____

(2)

- (b) Give an equation for the reaction of phosphorus(V) oxide with water.

Suggest a pH for the solution formed.

Equation

pH _____

(2)

Q6.

This question is about atomic structure.

- (a) There is a general trend for an increase in ionisation energy across Period 3. Give **one** example of an element that deviates from this trend.

Explain why this deviation occurs.

Element

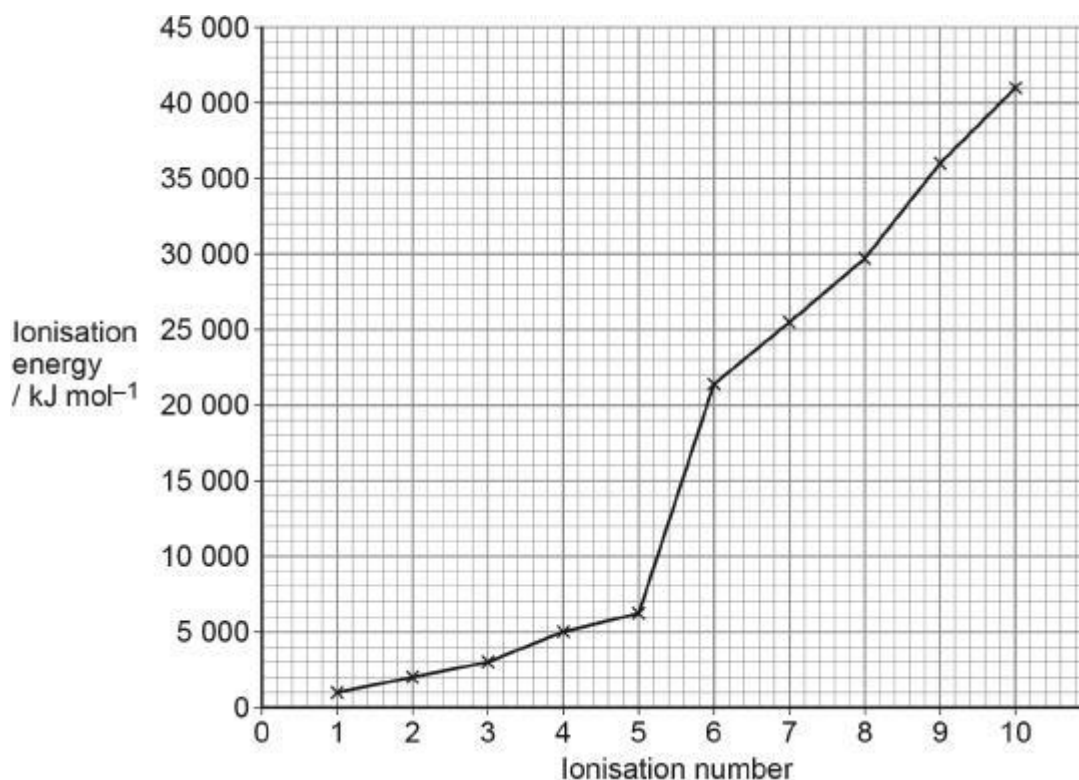
Explanation

(3)

- (b) Give an equation, including state symbols, to represent the process that occurs when the **third** ionisation energy of sodium is measured.

(1)

- (c) The graph shows the successive ionisation energies of a Period 3 element, **X**.



Identify element **X**.
Explain your choice.

Element

Explanation

(3)

(Total 7 marks)

Q7.

Which represents the correct order of increasing radius of the ions?

- A $F^- O^{2-} Li^+ Be^{2+}$
- B $Li^+ Be^{2+} O^{2-} F^-$
- C $Be^{2+} Li^+ F^- O^{2-}$
- D $O^{2-} F^- Li^+ Be^{2+}$

(Total 1 mark)

Q8.

Which of these elements has the highest melting point?

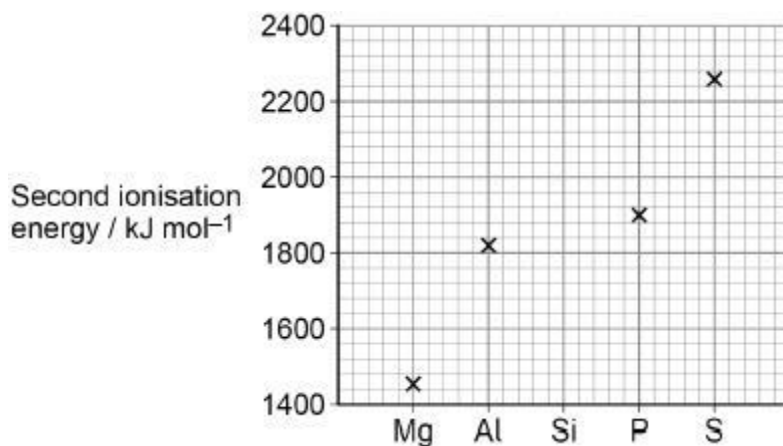
- A Argon
- B Chlorine
- C Silicon
- D Sulfur

(Total 1 mark)

Q9.

This question is about Period 3 elements.

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



- (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.

Element

Equation

(2)

- (c) Explain why the atomic radius decreases across Period 3, from sodium to chlorine.

(2)

- (d) Identify the element in Period 3, from sodium to chlorine, that has the highest electronegativity.

(1)

- (e) Phosphorus burns in air to form phosphorus(V) oxide.
Give an equation for this reaction.

(1)

(Total 7 marks)

Q10.

This question is about periodicity, the Period 4 elements and their compounds.

- (a) State the meaning of the term periodicity.

(1)

- (b) Identify the element in Period 4 with the highest electronegativity value.

(1)

- (c) Identify the element in Period 4 with the largest atomic radius.

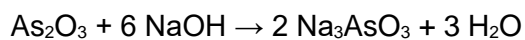
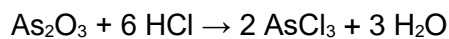
Explain your answer.

Element

Explanation

(3)

- (d) The equations for two reactions of arsenic(III) oxide are shown.



Name the property of arsenic(III) oxide that describes its ability to react in these two ways.

(1)

- (e) Complete the equation for the formation of arsenic hydride.

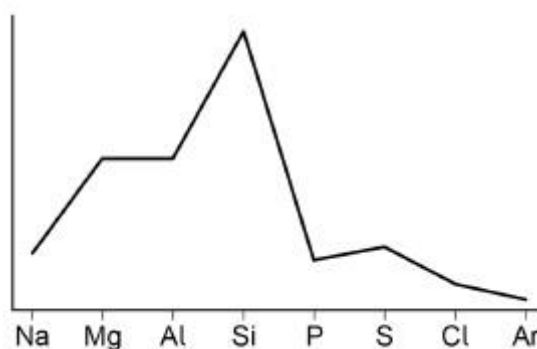


(1)

(Total 7 marks)

Q11.

The diagram shows how a property of Period 3 elements varies across the period.



What is the property?

- A** Atomic radius
- B** Electronegativity
- C** First ionisation energy
- D** Melting point

(Total 1 mark)

Q12.

Which element has the highest first ionisation energy?

- A Aluminium
- B Phosphorus
- C Silicon
- D Sulfur

(Total 1 mark)

Q13.

Which of these Period 3 elements has the highest melting point?

- A Aluminium
- B Phosphorus
- C Sodium
- D Sulfur

(Total 1 mark)

Q14.

Which is the correct order of melting points of these Period 3 elements?

- A phosphorus > sulfur > chlorine > argon
- B argon > chlorine > phosphorus > sulfur
- C sulfur > phosphorus > chlorine > argon
- D chlorine > phosphorus > sulfur > argon

(Total 1 mark)

Q15.

Which is the correct classification for the element yttrium (Y)?

- A** s block
- B** p block
- C** d block
- D** f block

(Total 1 mark)

Q16.

Which of the following is a correct statement about the trend in atomic radius across Period 3 of the Periodic Table?

- A** radius increases because the atoms have more electrons
- B** radius decreases because nuclear charge increases
- C** radius increases because shielding (screening) increases
- D** radius decreases because shielding (screening) decreases

(Total 1 mark)

Q17.

Which element is in the f-block of the Periodic Table?

- A** Palladium
- B** Phosphorus
- C** Platinum
- D** Plutonium

(Total 1 mark)

Q18.

Which elements are shown in increasing order of the stated property?

- A** Atomic radius: phosphorus, sulfur, chlorine.
- B** First ionisation energy: sodium, magnesium, aluminium.
- C** Electronegativity: sulfur, phosphorus, silicon.
- D** Melting point: argon, chlorine, sulfur.

(Total 1 mark)

Q19.

Which of these elements has the highest second ionisation energy?

- A** Na
- B** Mg
- C** Ne
- D** Ar

(Total 1 mark)

Q20.

- (a) Explain why the atomic radii of the elements decrease across Period 3 from sodium to chlorine.

(2)

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

(2)

- (c) Explain why sodium oxide forms an alkaline solution when it reacts with water.

(2)

- (d) Write an ionic equation for the reaction of phosphorus(V) oxide with an excess of sodium hydroxide solution.

(1)

(Total 7 marks)