

Group 2, the alkaline earth metals

5 questions · 21 marks

Answer all questions. The marks available are shown against each part. Every question is taken unaltered from a past paper; the source is noted beneath it. In Section A, choose the best answer and write its letter in the box.

Section A · Multiple choice

4 questions · 4 marks

1. What is the correct observation when barium metal is added to an excess of water? 1 mark
[1 mark]

A Forms a colourless solution only

☐

B Forms a colourless solution and effervesces

☐

C Forms a white precipitate only

☐

D Forms a white precipitate and effervesces

☐

Answer

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2. Barium metal is added to a large excess of water. 1 mark
Which observation is correct **and** complete? [1 mark]

A a colourless solution

☐

B a colourless solution with effervescence

☐

C a dense white precipitate

☐

D a dense white precipitate with effervescence

☐

Answer

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3. What is the most suitable reagent for detecting the presence of carbonate ions in the presence of an excess of sulfate ions? 1 mark

[1 mark]

A dilute NaOH(aq)

☐

B dilute H₂SO₄(aq)

☐

C BaCl₂(aq)

☐

D NaCl(aq)

☐

Answer

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4. An aqueous solution of a salt gives a white precipitate when mixed with aqueous silver nitrate and when mixed with dilute sulfuric acid. 1 mark

Which could be the formula of the salt?

[1 mark]

A BaCl₂

☐

B (NH₄)₂SO₄

☐

C KCl

☐

D Sr(NO₃)₂

☐

Answer

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Section B · Structured questions

1 question · 17 marks

5. This question is about metals and their compounds. 17 marks

1

State why the atomic radius of calcium is greater than the atomic radius of magnesium.

[1 mark]

.....

.....

.....

2

Magnesium reacts with steam.

Give an equation, including state symbols, for this reaction.

[1 mark]

[3 marks]

4

[6 marks]

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Identity of metal X

5

Sodium reacts with aluminium and hydrogen to form solid NaAlH_4 .

Give an equation for this reaction.

Suggest why NaAlH_4 has a high melting point.

[3 marks]

Equation

Suggestion

6

Give the equation for the reaction between H_3PO_4 and an excess of NaOH

[1 mark]

7

In a lithium cell, a lithium cobalt oxide electrode and a lithium electrode are used.

Give the equation for the reaction that occurs at the positive electrode.

[1 mark]

8

Commercial electrochemical cells can be rechargeable or non-rechargeable.

State why lithium cells can be recharged.

[1 mark]

— AQA 7405/1 Chemistry · June 2024 · Paper 1, Question 9