Introducing Chemical reactions – 2021/20 GCSE Gateway Chemistry Combined Science A

1. Nov/2021/Paper_J250/03/No.8

Iron oxide, Fe_2O_3, is heated with carbon, C. Iron, Fe, and another product, **X**, are made. Look at the equation for the reaction.

$Fe_2O_3(s) + 3C(s) \longrightarrow 2Fe(s) + 3\mathbf{X}(g)$

What is the formula of **X**?

A CO

B CO_2

C $FeCO_3$

D O_2

Your answer ☐ **[1]**

2. Nov/2021/Paper_J250/04/No.8

Sodium reacts with water to form sodium hydroxide and hydrogen.

What is the correctly balanced symbol equation for this reaction?

A $Na(s) + H_2O(l) \longrightarrow NaOH(aq) + H_2(g)$

B $Na(s) + 2H_2O(l) \longrightarrow NaOH(aq) + 2H_2(g)$

C $2Na(s) + H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$

D $2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$

Your answer ☐ **[1]**

3. Nov/2020/Paper_J250/04/No.7

Copper can be made by heating copper(I) sulfide in air.

Look at the equation.

$Cu_2S + O_2 \longrightarrow 2Cu + \mathbf{X}$

What is the formula of **X**?

A CuS

B S

C SO_2

D SO_3

Your answer ☐ **[1]**

4. Nov/2021/Paper_J250/09/No.7

A student completely reacts 0.403 g of magnesium oxide with an excess of carbon.

$2MgO(s) + C(s) \longrightarrow 2Mg(s) + CO_2(g)$

What is the mass of **magnesium** made?

The relative atomic mass, A_r, of O is 16.0 and of Mg is 24.3

A 0.1215 g

B 0.243 g

C 0.486 g

D 0.668 g

Your answer ☐ **[1]**

5. Nov/2021/Paper_J250/09/No.16

The mole is a unit of measurement used in chemistry for the amount of a substance.

(a) Define the term **mole**.

.....

.....

..... **[2]**

(b) Iron, Fe, reacts with steam, H_2O. An oxide of iron and hydrogen, H_2, are made.

The oxide of iron has the formula Fe_xO_y where **x** and **y** are whole numbers.

In a reaction 1.67 g of iron, Fe, reacts with 0.72 g of steam, H_2O. 0.08 g of hydrogen, H_2, are made.

(i) Calculate the number of moles of iron, steam and hydrogen.

Give your answers to **2** decimal places.

The relative atomic mass, A_r, of H is 1.0, of O is 16.0 and of Fe is 55.8

Moles of iron = ...

Moles of steam = ...

Moles of hydrogen = ...

[3]

(ii) Look at the reaction equation. It shows the formation of **1** mole of the oxide of iron, Fe_xO_y.

.....Fe(s) + ...H_2O(g) ⟶ Fe_xO_y(s) + ...H_2(g)

Use your answers to **(b)(i)** to balance the reaction equation **and** work out the formula of the oxide of iron, Fe_xO_y.

Formula of oxide of iron = ... **[2]**

6. Nov/2020/Paper_J250/09/No.7

What is the number of atoms in 0.0485 moles of carbon?

The Avogadro constant = 6.02×10^{23}.

A 8.05×10^{-26}

B 2.92×10^{22}

C 6.02×10^{23}

D 1.24×10^{25}

Your answer ☐ **[1]**

7. Nov/2020/Paper_J250/09/No.9

Which ionic equation is balanced correctly?

A $2Ag^+ + CO_3^{2-} \rightarrow Ag_2CO_3$

B $Al^{3+} + 3OH^- \rightarrow AlOH_3$

C $Ba^{2+} + SO_4^{2-} \rightarrow Ba_2(SO_4)_2$

D $2Pb^{2+} + NO_3^- \rightarrow Pb_2NO_3$

Your answer ☐ **[1]**

8. Nov/2020/Paper_J250/09/No.10

A student dissolves 5×10^{-3} moles of sodium hydroxide, NaOH, in 250 cm^3 of water.

What is the mass of sodium hydroxide in 25 cm^3 of the solution?
Relative formula mass, M_r, of NaOH = 40.0

A 5×10^{-2} g

B 0.02 g

C 2 g

D 4 g

Your answer ☐ **[1]**

9. Nov/2020/Paper_J250/10/No.6

Copper can be extracted from copper sulfide by heating it in air.

Copper sulfide contains 74.0% copper by mass.

An ore contains 2.00% copper sulfide.

What is the maximum mass of copper that can be extracted from 150 kg of the ore?

A 1.48 kg

B 2.22 kg

C 3.00 kg

D 111 kg

Your answer ☐ **[1]**