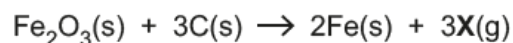


**Introducing Chemical reactions – 2021/20 GCSE Gateway Chemistry Combined Science A****1. Nov/2021/Paper\_J250/03/No.8**

Iron oxide,  $\text{Fe}_2\text{O}_3$ , is heated with carbon, C. Iron, Fe, and another product, X, are made. Look at the equation for the reaction.



What is the formula of X?

- A CO
- B  $\text{CO}_2$
- C  $\text{FeCO}_3$
- D  $\text{O}_2$

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  $\text{Na}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
- B  $\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{NaOH}(\text{aq}) + 2\text{H}_2(\text{g})$
- C  $2\text{Na}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
- D  $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$

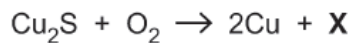
Your answer

[1]

**3. Nov/2020/Paper\_J250/04/No.7**

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

Look at the equation.



What is the formula of **X**?

**A** CuS

**B** S

**C** SO<sub>2</sub>

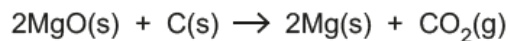
**D** SO<sub>3</sub>

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.



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** 0.1215g

**B** 0.243g

**C** 0.486g

**D** 0.668g

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,  $\text{H}_2\text{O}$ . An oxide of iron and hydrogen,  $\text{H}_2$ , are made.

The oxide of iron has the formula  $\text{Fe}_x\text{O}_y$  where **x** and **y** are whole numbers.

In a reaction 1.67 g of iron, Fe, reacts with 0.72 g of steam,  $\text{H}_2\text{O}$ . 0.08 g of hydrogen,  $\text{H}_2$ , are made.

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

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

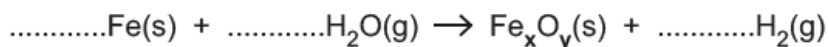
The relative atomic mass,  $A_r$ , of H is 1.0, of O is 16.0 and of Fe is 55.8

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,  $\text{Fe}_x\text{O}_y$ .



Use your answers to **(b)(i)** to balance the reaction equation **and** work out the formula of the oxide of iron,  $\text{Fe}_x\text{O}_y$ .

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 =  $6.02 \times 10^{23}$ .

A  $8.05 \times 10^{-26}$

B  $2.92 \times 10^{22}$

C  $6.02 \times 10^{23}$

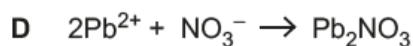
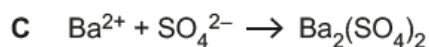
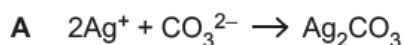
D  $1.24 \times 10^{25}$

Your answer

[1]

## 7. Nov/2020/Paper\_J250/09/No.9

Which ionic equation is balanced correctly?



Your answer

[1]

## 8. Nov/2020/Paper\_J250/09/No.10

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

What is the mass of sodium hydroxide in  $25 \text{ cm}^3$  of the solution?

Relative formula mass,  $M_r$  of NaOH = 40.0

A  $5 \times 10^{-2} \text{ g}$

B 0.02g

C 2g

D 4g

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]**