

[Reacting masses ideas]

Q1.(2018)

The relative formula mass of NaOH is 40.

What mass of sodium hydroxide, NaOH, is found in 100 cm³ of a 0.5 mol / dm³ solution of NaOH?

- A 0.2g
- B 0.4g
- C 2.0g
- D 4.0g

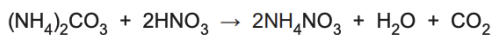
Your answer

[1]

Q2.(2018)

Ammonium carbonate reacts with nitric acid. Ammonium nitrate, water and carbon dioxide are made.

Look at the equation for the reaction.



Calculate the mass of ammonium nitrate, NH_4NO_3 , that can be made from 3.84g of ammonium carbonate, $(\text{NH}_4)_2\text{CO}_3$.

Answer = ... g [2]

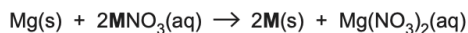
Q3.a(2019)

The student is given a sample of the metal magnesium and a solution of an unknown nitrate of metal **M**, $\text{MNO}_3(\text{aq})$.

The student does an experiment to identify metal **M**.

The student weighs the magnesium. Then the student adds the magnesium to the solution of the metal nitrate.

A displacement reaction takes place forming metal **M**:



The student separates the metal **M** and then weighs metal **M**.

Look at the student's results:

Mass of magnesium = 0.729 g

Mass of metal **M** = 6.476 g

(i) Calculate the moles of magnesium used in the experiment.

Moles of magnesium = ... [1]

Q3.b(2019)

Calculate the relative atomic mass of metal **M**.

Give your answer to **3** significant figures.

Relative atomic mass of metal **M** = ... [3]

Q3.c(2019)

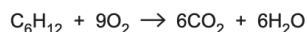
Use your answer from **(d)(ii)** and the Periodic Table to identify the metal **M**.

..... [1]

Q4.a(2019)

Hex-1-ene is a carbon-based compound with the formula C_6H_{12} .

20.0g of hex-1-ene is burned in oxygen. Carbon dioxide and water are made. Look at the equation for this reaction.



- (i) Calculate the number of molecules in 20.0g of hex-1-ene.

Avogadro's constant = $6.02 \times 10^{23} \text{ mol}^{-1}$

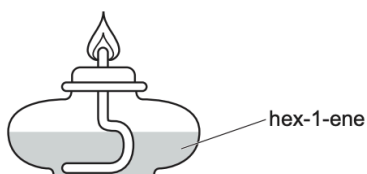
Give your answer to 3 significant figures.

Number of molecules of C_6H_{12} = ... [4]

Q4.b(2019)

Hex-1-ene was burned using a spirit burner in the laboratory.

The diagram shows the spirit burner.



Burning 20.0g of hex-1-ene should produce 62.9g of carbon dioxide.

The actual mass of carbon dioxide produced in the reaction was 48.4g.

What conclusion can be made about the **mass of oxygen** available for combustion?

.....
.....
..... [1]

Q5.(2020)

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]

Q6.(2020)

A student dissolves 5×10^{-3} moles of sodium hydroxide, NaOH, in 250 cm³ of water.

What is the mass of sodium hydroxide in 25 cm³ of the solution?

Relative formula mass, M_r , of NaOH = 40.0

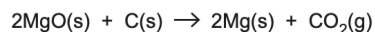
- A 5×10^{-2} g
- B 0.02 g
- C 2 g
- D 4 g

Your answer

[1]

Q7.(2021)

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 0.1215 g
- B 0.243 g
- C 0.486 g
- D 0.668 g

Your answer

[1]

Q8.a(2021)

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

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

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

Q8.b(2021)

Iron, Fe, reacts with steam, H₂O. An oxide of iron and hydrogen, H₂, 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, H₂O. 0.08 g of hydrogen, H₂, 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 = ...

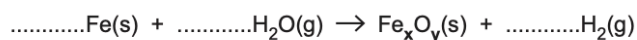
Moles of steam = ...

Moles of hydrogen = ...

[3]

Q8.c(2021)

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

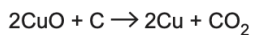


Use your answers to **(b)(i)** to balance the reaction equation **and** work out the formula of the oxide of iron, Fe_xO_y.

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

Q9.a(2024)

15 Copper can be made by reacting copper oxide, CuO, with carbon, C.



When 2.00 g of copper oxide reacts with 1.00 g of carbon, copper oxide is the limiting reactant.

(a) Explain the effect of a limiting reactant on a reaction.

.....

..... [1]

Q9.b(2024)

- (b) Calculate the number of moles in 2.00 g of copper oxide and 1.00 g of carbon.

Give your answers to **3** decimal places.

Relative atomic mass (A_r): C = 12.0 O = 16.0 Cu = 63.5

Number of moles in 2.00 g of copper oxide = ...mol

Number of moles in 1.00 g of carbon = ...mol
[3]

Q9.c(2024)

- (c) Use your answers in part (b) to explain why copper oxide is the limiting reactant.

.....
.....
..... [1]

Q9.d(2024)

- (d) The number of moles in a different mass of copper oxide is 0.045.



Calculate the maximum mass of copper, Cu, that can be made from 0.045 moles of copper oxide.

Give your answer to **2** significant figures.

Relative atomic mass (A_r): Cu = 63.5

Maximum mass of copper = ... g [3]