

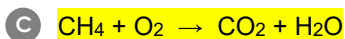
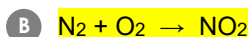
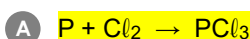


EXERCISE 3.2

QUESTION 1

Chemical reactions **A**, **B** and **C** are provided below.

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1.1 For reactions **A**, **B** and **C**:

1.1.1 balance the chemical equations.

1.1.2 draw models using circles of different sizes, patterns and colours to represent the different atoms. Add a key to distinguish between the different types of atoms.

1.1.3 indicate how the number of atoms and mass is conserved.

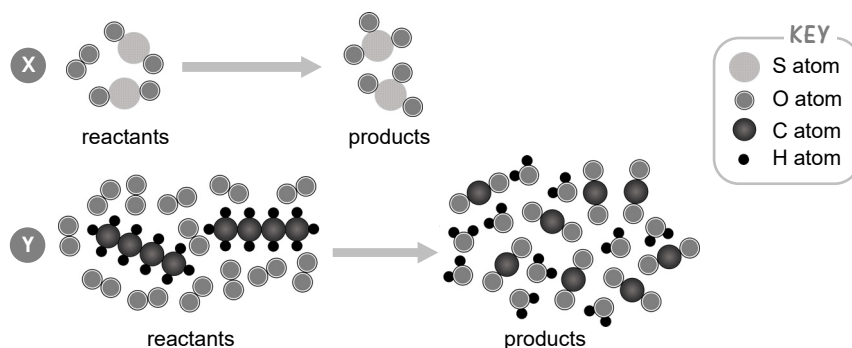
1.2 Answer the following questions about reaction **B**.

1.2.1 Determine the mass of the NO_2 gas produced if 2,8 g of N_2 gas and 8 g of O_2 gas is allowed to react and 1,6 g of O_2 gas remains unreacted at the end.

1.2.2 In a similar reaction, 8,4 g of N_2 gas is allowed to interact with an excess amount of O_2 gas. Calculate the mass of the NO_2 gas formed.

QUESTION 2

Diagrams **X** and **Y** represent molecular models for two chemical reactions. Circles of different sizes, patterns and colours represent the different atoms.



2.1 Write a balanced chemical equation for reaction **X** and **Y** respectively.

2.2 Indicate that the number of atoms and mass is conserved during each reaction.

QUESTION 3

It was found that elements react and combine in a certain **fixed ratio** to form a specific product. Sometimes the same elements can combine in more than one ratio which lead to the formation of different products.

When lightning strikes, a huge amount of energy is transmitted through the air. Nitrogen molecules react with oxygen molecules to form different nitrous oxides (N_xO_y) shown below:

Nitrous oxide molecules	NO	N ₂ O	NO ₂	NO ₃	N ₂ O ₅
Ratio V	1:1	a:b	1:2	1:c	d:e
Ratio W	14:16	28:16	14:f	14:48	g:h

3.1 State the *Law of Constant Composition*.

3.2 What does **Ratio V** show?

3.3 What does **Ratio W** show?

3.4 Complete the ratios by identifying the values for letters **a** to **h**.

3.5 Write a balanced chemical equation to show how the following molecules are formed:

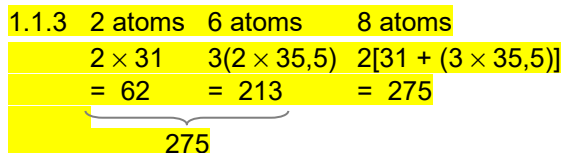
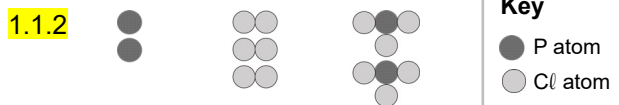
3.5.1 NO

3.5.2 N₂O₅

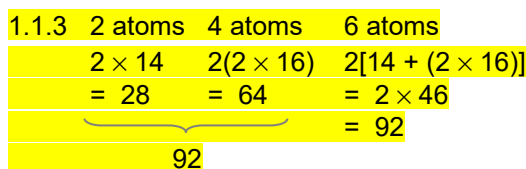
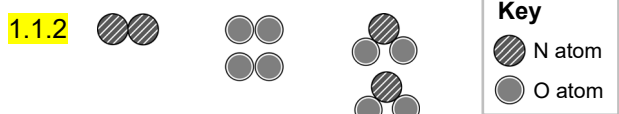
EXERCISE ANSWERS

QUESTION 1

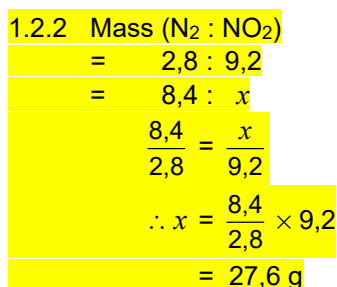
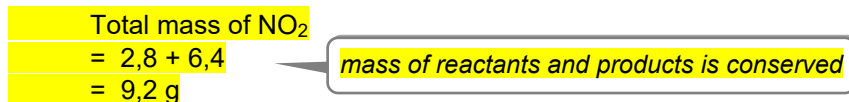
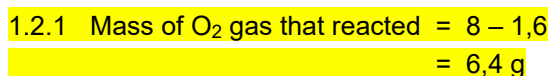
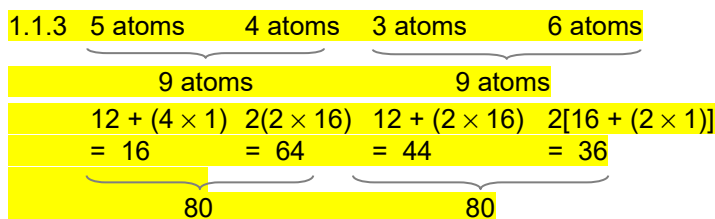
Reaction A



Reaction B



Reaction C



NOTE

the mass of the N_2 has tripled,
so will the mass of the NO_2

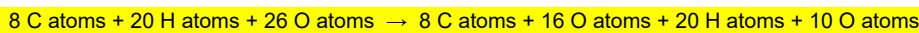
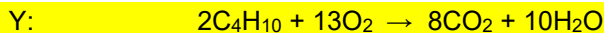


QUESTION 2



$$\text{LH} = (2 \times 16) + 2[32 + (2 \times 16)] \\ = 160$$

$$\text{RH} = 2[32 + (3 \times 16)] \\ = 160$$



$$\text{LH} = 2[(4 \times 12) + (10 \times 1)] + 13(2 \times 16) \\ = 532$$

$$\text{RH} = 8[12 + (2 \times 16)] + 10[(2 \times 1) + 16] \\ = 532$$

QUESTION 3

3.1 A specific chemical compound always contains the same elements in the same ratio.

3.2 The molar ratio in which the different element atoms have bonded.

3.3 The mass ratio in which the different element atoms have bonded.

3.4 a = 2 b = 1 c = 3 d = 2 e = 5 f = 32 g = 28 h = 80

