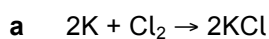




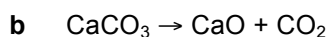
1 Complete the table to show what happens when these elements react together, or whether no reaction occurs.

elements	what happens			type of bonding (if reaction occurs)		type of compound (if reaction occurs)	
	no reaction	electrons shared	electrons transferred	covalent	ionic	molecular	ionic
iron + iodine			✓		✓		✓
helium + chlorine	✓						
oxygen + sulfur		✓		✓		✓	

2 Write a word equation for each of the following reactions.

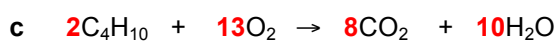


potassium + chlorine → potassium chloride



calcium carbonate → calcium oxide + carbon dioxide

3 Balance the equation for each of the following reactions.





- 1 a In what order are the elements arranged in the Periodic Table? **atomic number order**
- b How many electrons are in the outer shell of atoms of the following elements?
aluminium **3** fluorine **7** silicon **4**
- c Give the group and period number of the element with electron structure 2,8,5.
group **5** period **3**
- d Which group are the following elements in? The electron structure of these elements is given.
2,8,8,1 **1** 2,6 **6** 2,8,18,5 **5**
- 2 a Explain why elements that are in the same group in the Periodic Table have similar properties.
same number of electrons in the outer shell
- b Explain why the elements in Group 0 are unreactive.
they have stable electron structures and so do not need to gain/lose/share electrons
- c Explain why the elements in Group 1 are very reactive.
they have one electron in their outer shell and so it is easy to lose one electron to get a stable electron structure



GCSE

QUICK
CHECK

STRUCTURE & BONDING (A)

1 Give the formula of the following ions.

Bromide Br^- sulfate SO_4^{2-} silver(I) Ag^+

2 Give the formula of the following ionic compounds.

potassium sulfide K_2S sodium carbonate Na_2CO_3
calcium hydroxide $\text{Ca}(\text{OH})_2$ aluminium nitrate $\text{Al}(\text{NO}_3)_3$

3 Potassium fluoride is an ionic compound containing K^+ and F^- ions.

- a Give the electron structure of the K^+ ions. **2,8,8**
- b Give the electron structure of the F^- ions. **2,8**
- c Potassium fluoride melts at 858°C . Explain why potassium fluoride has a high melting point.
**strong attraction between positive and negative ions
that takes a lot of energy to overcome**
- d Explain why potassium fluoride conducts electricity when molten.
**ions can move
to carry charge through the substance**
- e Explain why potassium fluoride does not conduct electricity as solids.
**ions cannot move
so cannot carry charge through the substance**



1 What is the mass of one mole of CO₂?

$$M_r = 12 + 2(16) = 44$$

$$\text{mass of 1 mole of CO}_2 = 44 \text{ g}$$

2 How many moles are there in 99 g of H₂O?

$$M_r = 2(1) + 16 = 18$$

$$\text{moles} = \frac{\text{mass}}{M_r} = \frac{99}{18} = 5.5 \text{ moles}$$

3 What is the mass of 0.250 moles of N₂?

$$M_r = 2(14) = 28$$

$$\text{mass} = M_r \times \text{moles} = 28 \times 0.250 = 7.0 \text{ g}$$

4 How many moles are there in 1.2 kg of Mg?

$$M_r = 24$$

$$\text{moles} = \frac{\text{mass}}{M_r} = \frac{1200}{24} = 50 \text{ moles}$$

5 Calculate the relative formula mass (M_r) of each of the following substances.

a Mg(NO₃)₂ $M_r = 24 + 2(14) + 6(16) = 148$

b oxygen O_2 $M_r = 2(16) = 32$

c potassium sulfate K_2SO_4 $M_r = 2(39) + 32 + 4(16) = 174$

6 Calculate the mass in grams of one atom of ³¹P. Give your answer in standard form to 3 significant figures.
(the Avogadro constant = $6.022 \times 10^{23} \text{ mol}^{-1}$)

$$\text{mass of one atom} = \frac{31}{6.022 \times 10^{23}} = 5.15 \times 10^{-23} \text{ g}$$