

- Human haemoglobin has a molar weight of $6.45 \times 10^4 \text{ g mol}^{-1}$ and contains 3.46 g of iron per kg. Calculate the number of iron atoms in each molecule of haemoglobin.

A mole of haemoglobin has a mass of $6.45 \times 10^4 \text{ g} = 64.5 \text{ kg}$. As each kilogram contains 3.45 g of iron, a mole contains $(64.5 \times 3.45) = 223 \text{ g}$ of iron.

The atomic mass of iron is 55.85 so this mass of iron corresponds to:

$$\text{number of moles of iron} = \frac{\text{mass}}{\text{atomic mass}} = \frac{223}{55.85} = 3.98$$

Answer: 4 iron atoms per molecule