

$$N_A = 6.022 \times 10^{23} \text{ particles/mol}$$

1. A small pin contains 0.0178 mol of iron, Fe. How many atoms of iron are in the pin?
2. A ring contains 4.70×10^{-4} mol of gold, Au. How many atoms of gold are in the sample?
3. Calculate the number of molecules in 1.058 mol of H_2O .
4. Calculate the number of atoms in 0.750 mole of Fe
5. How many formula units are in 3.11 mol of $\text{Ca}(\text{NO}_3)_2$?
6. A litre of water contains 55.6 mol of water. How many molecules of water are in this sample?
7. Diethyl ether, $\text{C}_2\text{H}_6\text{O}$, has been used as an anaesthetic. A bottle of diethyl ether contains about 4.00 mol of $\text{C}_2\text{H}_6\text{O}$.
 - (a) How many molecules are in the bottle?
 - (b) How many atoms are in the bottle?
 - (c) How many carbon atoms are in the bottle?
8. Consider a 4.29 mol sample of sodium phosphate, Na_3PO_4 .
 - (a) How many formula units are in the sample?
 - (b) How many sodium ions, Na^+ , are in the sample?
 - (c) How many phosphate ions, PO_4^{3-} , are in the sample?
 - (d) How many oxygen atoms are in the sample?

9. A certain coil of pure copper wire has a mass of 25.00 g. This mass of copper corresponds to 0.393 mol of copper.
- (a) How many atoms of copper are in the coil?
- (b) How many atoms of copper would there be in a coil of pure copper wire with a mass of 200.00 g?
- (c) How many atoms of copper would there be in a coil of pure copper wire with a mass of 5.00 g?
10. A sample of bauxite ore contains 8.91×10^{23} formula units of Al_2O_3 . How many moles of Al_2O_3 are present?
11. A vat of lye contains 2.93×10^{24} formula units of NaOH . How many moles of NaOH are in the vat?
12. A sample of formaldehyde, CH_2O , contains contains 8.32×10^{24} atoms. How many moles of formaldehyde are in the sample?
13. A sample of pure sulfuric acid, H_2SO_4 , contains 6.40×10^{23} oxygen atoms. How many moles of sulfuric acid are in the sample?
14. A sample of sulfur trioxide, SO_3 , contains 6.56×10^{24} molecules.
- (a) How many moles of SO_3 are present?
- (b) How many moles of atoms are present?
15. A balloon is filled with 0.500 mol of helium. How many He atoms are in the balloon?
16. A sample of hexane, C_6H_{14} , contains 5.69 mol of hexane.
- (a) How many molecules are in the sample?
- (b) How many hydrogen atoms are in the sample?