

1 - Moles and mass calculations

1. Symbols

Prerequisite: common chemical names.

(a) State the symbols used to represent

i. molar mass

i. _____

ii. relative molecular mass

ii. _____

iii. mass of a sample

iii. _____

iv. number of moles of a sample

iv. _____

v. Avogadro's number

v. _____

vi. relative atomic mass

vi. _____

(b) State the symbols used to represent

i. molar mass of ammonia

i. _____

ii. relative molecular mass of C_6H_6

ii. _____

iii. mass of water

iii. _____

iv. number of moles of ethanol

iv. _____

v. relative atomic mass of sodium

v. _____

2. Calculating molar mass

Calculate the molar mass for the following. Report units and give your answers to 4 significant figures.

(a) Sulphuric acid

(a) _____

.....

(b) $\text{HCl}_{(\text{aq})}$

(b) _____

.....

(c) ${}^2\text{H}{}^{35}\text{Cl}_{(\text{aq})}$

(c) _____

(d) $\text{CuSO}_4_{(\text{s})}$

(d) _____

.....

(e) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}_{(\text{s})}$

(e) _____

.....

3. Mole conversions

Give your answers to appropriate number of significant figures.

(a) **Without using a calculator**, determine the **moles** of particles of a compound **X** in:

i. 6.02×10^{23} molecules of **X**

i. _____

ii. 6.02×10^{25} molecules of **X**

ii. _____

iii. 1.20×10^{15} molecules of **X**

iii. _____

(b) **Without using a calculator**, determine the **number of particles** in:

i. 1.00 mol

i. _____

ii. 1.00×10^3 mol

ii. _____

iii. 5.00×10^3 mol

iii. _____

iv. 5.00×10^{-3} mol

iv. _____

.....

v. 0.200 mmol

v. _____

.....

4. **Moles** → **mass**

Give your answers to appropriate number of significant figures.

(a) i. Deduce the molar mass of $\text{CaCO}_3(\text{s})$.

i. _____

.....

ii. Deduce the mass contained in 2.00 mol of $\text{CaCO}_3(\text{s})$.

ii. _____

.....

iii. Deduce the mass of 0.250 mol $\text{CaCO}_3(\text{s})$.

iii. _____

.....

(b) Deduce the mass, in g, in:

i. 8.00 mol copper powder.

i. _____

.....

ii. 5.00 mol ZnO_(s)

ii. _____

.....
.....
.....

iii. 5.00 mmol H₂O_(g)

iii. _____

.....
.....
.....

5. Mass → moles

Give your answers to appropriate number of significant figures.

(a) i. Deduce the molar mass of CaCO_{3(s)} .

i. _____

.....
.....

ii. Deduce the number of moles contained in 200.2 g of CaCO_{3(s)} .

ii. _____

.....
.....

iii. Deduce the number of moles contained in 5.00 g of $\text{CaCO}_3(\text{s})$.

iii. _____

.....

(b) Deduce the number of moles in:

i. 8.00 g sodium hydroxide powder.

i. _____

.....

ii. 5.00 g $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$

ii. _____

.....

iii. 5.00 kg $\text{H}_2(\text{g})$

iii. _____

.....

iv. 0.360 mg NH_3

iv. _____

<p>.....</p> <p>.....</p> <p>.....</p>
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