## 2. Atoms, molecules and stoichiometry — Starter Quiz ·

A-Level Chemistry Name: _____ Score: _____

1. The weighted mean mass of an element's atoms, compared to carbon-12, is the relative _____ mass.

   _____

2. One mole of any substance contains $6.02 \times 10^{23}$ _____.

   _____

3. A balanced equation has the same number of each type of atom on both sides.

   ☐ True ☐ False

4. The simplest whole-number ratio of atoms in a compound is the _____ formula.

   _____

5. Percentage yield is the theoretical yield divided by the actual yield, times 100.

   ☐ True ☐ False

6. At room temperature and pressure, one mole of any gas occupies about _____ $dm^3$.

   _____

7. The relative atomic mass (Ar) of an element is:

   ☐ its number of protons

   ☐ the mass of its heaviest isotope

   ☐ the weighted average mass of its atoms over all isotopes, compared with 1/12 of carbon-12

   ☐ its mass in grams

8. One mole of any substance contains:

   ☐ 100 particles

   ☐ 12 particles

   ☐ exactly 1 gram of particles

   ☐ $6.02 \times 10^{23}$ particles

9. A Group 2 element usually forms an ion with charge:

   ☐ $+2$

   ☐ $-1$

   ☐ $+1$

☐ $-2$

10. Ethane has empirical formula $CH_3$ and molecular formula $C_2H_6$. This shows:

    ☐ the molecular formula is simpler

    ☐ they are the same thing

    ☐ the empirical formula is the simplest ratio; the molecular formula is the actual count

    ☐ ethane has no formula

# 2. Atoms, molecules and stoichiometry

**Answers** ·

A-Level Chemistry

1. **atomic**

   Ar (relative atomic mass) accounts for the abundance of each isotope.

2. **particles**

   This number is the Avogadro constant.

3. **True**

   Atoms are neither created nor destroyed, so mass is conserved.

4. **empirical**

   The molecular formula is a whole-number multiple of the empirical formula.

5. **False**

   False. Percentage yield = actual yield ÷ theoretical yield × 100. It compares what you obtained with the maximum possible.

6. **24**

   This is the molar gas volume at rtp (24 $dm^3$ per mole).

7. **the weighted average mass of its atoms over all isotopes, compared with 1/12 of carbon-12**

   Ar is the average over all isotopes (weighted by abundance), measured against 1/12 of a carbon-12 atom.

8. **$6.02 \times 10^{23}$ particles**

   A mole always contains the Avogadro number of particles, $6.02 \times 10^{23}$.

9. **+2**

   Group 2 elements lose two electrons to form 2+ ions; Group 17 form −1 ions.

10. **the empirical formula is the simplest ratio; the molecular formula is the actual count**

    Empirical = simplest whole-number ratio; molecular = the real number of atoms per molecule.