3. Stoichiometry

Starter Quiz ·

IGCSE Chemistry Name: _____ Score: _____

1. How many hydrogen atoms are in one molecule of H_2O?

   _____

2. A balanced equation must have the same number of each atom on both sides because:

   ☐ energy is created

   ☐ mass is lost

   ☐ atoms disappear

   ☐ atoms are not created or destroyed

3. Using Ar(H)=1 and Ar(O)=16, what is the Mr of water (H_2O)?

   _____

4. How many moles are in 36 g of water (Mr = 18)?

   _____

5. What volume (dm^3) does 3 moles of a gas occupy at rtp (1 mole = 24 dm^3)?

   _____

6. How many moles are in 4 g of hydrogen gas (Mr = 2)?

   _____

7. A compound contains 12 g carbon and 4 g hydrogen. Use Ar: C=12, H=1. Give its empirical formula using ordinary digits.

   _____

8. A calculated yield is 112% after crystals were weighed before drying. What is the best next step?

   ☐ Conclude the reaction created more atoms.

   ☐ Record 100% without changing the experiment.

   ☐ Dry, reweigh and check purity and the theoretical result.

9. Known acid is used to find an alkali concentration. The endpoint is overshot. How is the calculated alkali concentration affected?

   ☐ Unchanged: endpoint errors cancel.

   ☐ Too high: too many acid moles are attributed to the alkali.

   ☐ Too low: extra acid always dilutes the alkali.

10. For Ca^{2+} and Cl^-, which Ca:Cl ratio gives a neutral ionic formula?

    ☐ 1 : 2

    ☐ 2 : 1

    ☐ 1 : 1

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Answers ·

IGCSE Chemistry

1. **2**

   The subscript 2 means two hydrogen atoms.

2. **atoms are not created or destroyed**

   Conservation of mass: atoms are only rearranged.

3. **18**

   $(2 \times 1) + 16 = 18$.

4. **2**

   moles $= 36 \div 18 = 2$.

5. **72**

   volume $= 3 \times 24 = 72$ dm^3.

6. **2**

   moles $= 4 \div 2 = 2$.

7. **CH4**

   Amounts C:H=12/12 : 4/1 = 1:4, so CH_4.

8. **Dry, reweigh and check purity and the theoretical result.**

   Surface or retained water adds mass that is not the dry product. An apparent yield above 100% needs investigation.

9. **Too high: too many acid moles are attributed to the alkali.**

   The extra acid inflates the inferred alkali amount, then the calculation divides by the same original alkali volume.

10. **1 : 2**

    One Ca^{2+} balances two Cl^- ions. The simplest ratio is 1:2, giving $CaCl_2$.