



Quantitative Chemistry

Multiple Choice Questions

Set 3

Tick **one** box.

1. Nitric acid contains one atom of hydrogen, one atom of nitrogen and three atoms of oxygen. What is the chemical formula for nitric acid?

A. HNO_3

B. $\text{H}(\text{NO})_3$

C. NOH_3

D. N_3OH

2. What is the correctly balanced symbol equation for the reaction between iron and hydrochloric acid?

A. $\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_2 + 2\text{H}_2$

B. $\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$

C. $2\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$

D. $4\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$

3. 1.2g of sodium chloride is formed from 0.5g of sodium. What is the mass of chlorine that reacts?

A. 0.6g

B. 0.7g

C. 1.2g

D. 1.7g

4. What is the relative formula mass of sodium carbonate (Na_2CO_3)? Relative atomic masses (A_r): Na = 23, C = 12, O = 16

A. 51

B. 83

C. 106

D. 130

5. What is the concentration of a solution containing 45g of solute dissolved in 20dm^3 of solvent?

A. $0.44\text{g}/\text{dm}^3$

B. $2.25\text{g}/\text{dm}^3$

C. $65\text{g}/\text{dm}^3$

D. $900\text{g}/\text{dm}^3$



6. A solution has a concentration of 4.8g/dm^3 . What mass of solute is dissolved in 2.5dm^3 of the solution?

- A. 0.52g
- B. 1.92g
- C. 4.8g
- D. 12g

7. What is percentage yield? **(Chemistry Only)**

- A. the amount of a product obtained as a percentage of the maximum theoretical mass of the product
- B. the percentage of starting materials in a chemical reaction that end up as useful products
- C. the relative atomic mass of an element in a compound as a percentage of the relative formula mass of the compound
- D. the percentage of substances produced in a chemical reaction that are soluble in water

8. A student calculated that 3.00g of magnesium oxide would be produced in a reaction between magnesium and oxygen. The actual yield of magnesium oxide was 0.96g . What was the percentage yield? **(Chemistry Only)**

- A. 0.32%
- B. 7.5%
- C. 32%
- D. 68%

9. What is atom economy? **(Chemistry Only)**

- A. the relative cost of carrying out a chemical reaction in terms of energy
- B. the number of atoms that must be put into a chemical reaction to make carrying out the reaction worthwhile
- C. a measure of the amount of starting materials in a chemical reaction that end up as useful products
- D. the number of atoms of a particular element present in a compound as a proportion of the total number of atoms in the compound



10. The symbol equation for the reaction between magnesium carbonate and sulfuric acid is $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$. What is the atom economy of this reaction to produce magnesium sulfate? (**Chemistry Only**)

Relative formula masses (M_r): $\text{Mg} = 24$, $\text{H}_2\text{SO}_4 = 98$, $\text{MgSO}_4 = 120$, $\text{H}_2 = 2$

- A. 1.6%
- B. 20%
- C. 82%
- D. 98%