



STARTER FOR 10!!!

1.1.2. Mass and concentration

Calculate the answers to the calculations below and place them (to the correct no. of sig. fig.) in the appropriate square. The arrows indicate the direction the numbers must follow. For the 10th mark complete the remainder of the Sudoku grid. (1 mark for each answer)

WARNING Take care with your significant figures and RAMs in order to avoid the wrong digit in the wrong square! (Relative atomic masses, H 1.0; O 16.0; Na 23.0; S 32.1; Cl 35.5; Fe 55.8; Cu 63.5)

| | | | | | | | | |
|-----|---|-----|-----|-----|-----|-----|---|-----|
| a → | | | 4 | 9 | 8 | 1 | 7 | d ↓ |
| 9 | | c → | b ↓ | 3 | | 8 | 2 | |
| 3 | 1 | 8 | | 2 | e ↓ | | 4 | |
| 7 | 8 | 2 | 6 | | | 9 | | 4 |
| f ↓ | | 4 | g → | | | 2 | 3 | |
| | 3 | 9 | | 4 | | 7 | 8 | |
| | 7 | 6 | 2 | | 1 | 3 | 9 | 8 |
| | | 3 | 9 | h → | | | | 7 |
| | 9 | 1 | 3 | 8 | 7 | i → | | |

- The concentration of a solution of 265 moles of NaOH dissolved in 1 dm³ of water (3 sig. fig.)
- The volume of water in dm³ needed to dilute 176 moles of HCl to make a 1 mol dm⁻³ solution (3 sig. fig.)
- The mass of H₂SO₄ that should be dissolved in 1 dm³ of water to make a solution of concentration 0.72 mol dm⁻³ (2 sig. fig.)
- The volume of water in cm³ that must be added to 0.56 g of anhydrous CuSO₄ to produce a 0.1 mol dm⁻³ solution (2 sig. fig.)
- The number of moles of ammonia that must be dissolved in 2,696 dm³ of water to produce 2.0 mol dm⁻³ ammonia solution (4 sig. fig.)
- The concentration in mol dm⁻³ of an accurate solution of concentration 16.48537 mol cm⁻³ (5 sig. fig.)
- The mass of FeSO₄·7H₂O that must be dissolved in 1,582 cm³ of water to form a solution of concentration 2.0 mol dm⁻³ (to 3 sig. fig.)
- The volume in dm³ of water that 10 moles of NaCl must be dissolved in to produce a 0.0155 mol dm⁻³ solution of brine (3 sig. fig.)
- The concentration in mol dm⁻³ of a solution of NaOH with a concentration of 18,480 kg m⁻³ (3 sig. fig.)



STARTER FOR 10!!!

Chapter 1: Quantitative chemistry answers

1.1. The mole

1.1.1. Moles and maths

1. 43.7
2. 69.8
3. 0.688
4. 0.683
5. 0.25

1.1.2. Moles and concentration

| | | | | | | | | |
|---------|---|---------|---------|---------|---------|---------|---|---------|
| a→ 2 | 6 | 5 | 4 | 9 | 8 | 1 | 7 | d↓ 3 |
| 9 | 4 | c→ 7 | b↓ 1 | 3 | 6 | 8 | 2 | 5 |
| 3 | 1 | 8 | 7 | 2 | e↓ 5 | 6 | 4 | 9 |
| 7 | 8 | 2 | 6 | 1 | 3 | 9 | 5 | 4 |
| f↓ 1 | 5 | 4 | g→ 8 | 7 | 9 | 2 | 3 | 6 |
| 6 | 3 | 9 | 5 | 4 | 2 | 7 | 8 | 1 |
| 4 | 7 | 6 | 2 | 5 | 1 | 3 | 9 | 8 |
| 8 | 2 | 3 | 9 | h→ 6 | 4 | 5 | 1 | 7 |
| 5 | 9 | 1 | 3 | 8 | 7 | i→ 4 | 6 | 2 |

1.1.3. Concentration and dilution

| | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|------------|
| Solution A | 2 | 9 | 1 | 1 | 4 | 0 | 1 | 1 | Solution I |
| Solution B | 1 | 2 | 6 | 0 | 4 | 9 | 6 | 2 | Solution J |
| Solution C | 2 | 6 | 7 | 4 | 3 | 5 | 1 | 1 | Solution K |
| Solution D | 5 | 3 | 2 | 1 | 2 | 9 | 0 | 2 | Solution L |
| Solution E | 1 | 0 | 8 | 9 | 0 | 5 | 6 | 3 | Solution M |
| Solution F | 2 | 2 | 7 | 3 | 7 | 2 | 5 | 3 | Solution N |
| Solution G | 8 | 4 | 6 | 1 | 5 | 2 | 1 | 2 | Solution O |
| Solution H | 6 | 2 | 4 | 2 | 3 | 9 | 9 | 7 | Solution P |