Concentration Calculations

Answer the following questions. Show your working

Remember: 1 dm^3 = 1 000 cm^3

1. State the formula used to calculate concentration using mass and volume.

Concentration = mass ÷ volume

2. Calculate the concentration (in g/dm3) of:
   a. 40 g solute in 350 dm^3 **0.11 g/dm^3**
   b. 100 g solute in 77 dm^3 **1.29 g/dm^3**
   c. 0.08 g solute in 20 cm^3 **4 g/dm^3**
   d. 90g solute in 780 cm^3 **115.38 g/dm^3**

3. The mass of H_2SO_4 is 32.5 g and the volume of the solution is 0.400 dm^3. Calculate the concentration of the solution formed in g/dm^3. **81.25 dm^3**
4. Explain what would happen to the concentration in question 2 if more water was added to the solution. **The concentration would decrease, because the volume of the solution would increase but the mass of solute would stay the same.**
5. A 750 cm^3 solution of sodium chloride contains 25 g of solute. Calculate the concentration of the solution. **33.33 g/dm^3**
6. What is the concentration of 2 g of copper chloride in 1.5 dm^3 of solution? **1.33 g/dm^3**
7. State the formula used to calculate mass using concentration and volume.

   Mass = concentration x volume

8. Calculate the mass of solute in:
   a. 25 cm^3 of a 2.3 g/dm^3 solution (remember to convert to dm^3) **0.058 g**
   b. 250 cm^3 of a 71 g/dm^3 solution **17.75 g**
   c. 2.3 dm^3 of a 61 g/dm^3 solution **140.3 g**

9. A solution of sodium chloride has a concentration of 400 g/dm^3. Calculate the mass of sodium chloride in 0.8 dm^3 of solution. **320 g**
10. Explain what would happen to the mass of solute in question 6 if more water was added to the solution. **It would not change, because more water does not affect the total mass of any particles in the solution, it will only affect the concentration.**

11. A solution of sodium chloride has a concentration of 400 g/dm^3. Calculate the mass of sodium chloride in 400 cm^3 of solution. **160 g**

12. A student pours 0.2 dm^3 of hydrochloric acid into a beaker. The acid had a concentration of 75 g/dm^3. Calculate the mass of hydrochloric acid in the solution. **15 g**

13. Using 83 g of solute, how much water is needed to:
    a. Make a 34 g/dm^3 solution? **2.44 dm^3**
    b. Make a 0.1 g/dm^3 solution? **830 dm^3**
    c. Make a 83 g/dm^3 solution? **1 dm^3**
    d. Make a 79 g/dm^3 solution? **1.05 dm^3**