

Solving numerical problems related to concentration of solutions

1. 6 g of solid magnesium sulphate, MgSO_4 is added into a beaker containing 200 cm^3 of water. Calculate the concentration in g dm^{-3} , for the solution produced.

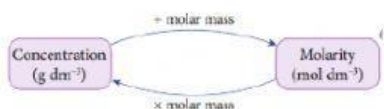
$$\text{Volume of water} = \frac{200}{\boxed{}} = \boxed{} \text{ dm}^3$$

$$\begin{aligned} \text{Concentration} &= \frac{\text{mass (g)}}{\text{Volume (dm}^3\text{)}} \\ &= \frac{\boxed{} \text{ g}}{\boxed{} \text{ dm}^3} = \boxed{} \text{ g dm}^{-3} \end{aligned}$$

2. 0.4 mol of zinc chloride, ZnCl_2 is dissolved in water to produce 2 dm^3 of solution. Calculate the molarity of the solution prepared.

$$\text{Molarity} = \frac{\text{no. of mol of ZnCl}_2}{\text{volume of water (dm}^3\text{)}} = \frac{\boxed{} \text{ mol}}{\boxed{} \text{ dm}^3} = \boxed{} \text{ mol dm}^{-3}$$

3. What is the concentration of 0.5 mol dm^{-3} sulphuric acid, H_2SO_4 in g dm^{-3} ?
[Relative atomic mass: H = 1, O = 16, S = 32]

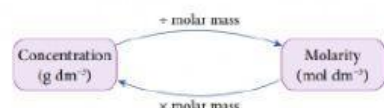


$$\text{Molarity} = \boxed{} \text{ mol dm}^{-3}$$

$$\begin{aligned} \text{Molar mass of } \text{H}_2\text{SO}_4 &= 2\text{H} + 1\text{S} + 4\text{O} \\ &= 2() + 1() + 4() \\ &= \boxed{} \text{ g mol}^{-1} \end{aligned}$$

$$\begin{aligned} \text{Concentration of } \text{H}_2\text{SO}_4 &= \boxed{} \text{ mol dm}^{-3} \times \boxed{} \text{ g mol}^{-1} \\ &= \boxed{} \text{ g dm}^{-3} \end{aligned}$$

4. The concentration of sodium chloride solution, NaCl is 1.989 g dm^{-3} . Calculate the molarity of the solution in mol dm^{-3} .
[Relative atomic mass: Na = 23, Cl = 35.5]



$$\text{Concentration} = \boxed{} \text{ g dm}^{-3}$$

$$\begin{aligned} \text{Molar mass of NaCl} &= 1\text{Na} + 1\text{Cl} \\ &= \boxed{} + \boxed{} \\ &= \boxed{} \text{ g mol}^{-1} \end{aligned}$$

$$\begin{aligned} \text{Molarity of NaCl} &= \frac{\boxed{} \text{ g dm}^{-3}}{\boxed{} \text{ g mol}^{-1}} \\ &= \boxed{} \text{ mol dm}^{-3} \end{aligned}$$

5. Calculate the number of moles of sodium hydroxide, NaOH in 2.5 dm^3 of 0.2 mol dm^{-3} sodium hydroxide solution, NaOH.

Volume in dm^3

Molarity

$$n = MV$$

Volume of solution is in dm^3 .

$$\begin{aligned} \text{Number of mole Of NaOH, } n &= \text{Molarity} \times \text{Volume} \\ &= \boxed{} \times \boxed{} \\ &= \boxed{} \text{ mol} \end{aligned}$$

6. Given the molarity of 250 cm^3 of barium hydroxide solution, Ba(OH)_2 is 0.1 mol dm^{-3} .
How many moles of hydroxide ion, OH^- is in the solution?

$$n = \frac{MV}{1000}$$

Volume of
solution is
in cm^3 .

Molarity, M

$$\begin{aligned} \text{Number of mole of Ba(OH)}_2 &= \frac{\text{Molarity} \times \text{Volume}}{1000} \\ &= \frac{\boxed{} \times \boxed{}}{1000} \\ &= \boxed{} \text{ mol} \end{aligned}$$