

Solutions - 2 - ppm/ppb/ppt.  $\frac{1}{10^6}$   $\frac{1}{10^9}$   $\frac{1}{10^{12}}$

1) Express  $45 \text{ mg NO}_3^- \text{ mg/L}$  water in ppm (parts per million)

$$* \frac{45 \text{ mg}}{1 \text{ L H}_2\text{O}} \xrightarrow{\text{to g}} \frac{45 \text{ mg NO}_3^-}{1000 \text{ g H}_2\text{O}} = \frac{45 \text{ mg NO}_3^-}{(1000 \text{ g} \times \frac{1000 \text{ mg}}{\text{g}})} = \frac{45 \text{ mg NO}_3^-}{10^6 \text{ mg}} = \boxed{45 \text{ ppm}}$$

2) What is the conc. of  $\text{Na}^+$  in  $0.00152 \text{ M Na}_2\text{SO}_4$ ?

$$* \frac{1.52 \times 10^{-3} \text{ mol Na}_2\text{SO}_4}{1 \text{ L soln.}} \times \frac{2 \text{ mol Na}^+}{1 \text{ mol Na}_2\text{SO}_4} \times \frac{22.99 \text{ g Na}^+}{1 \text{ mol Na}^+} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1 \text{ mL H}_2\text{O}}{1 \text{ g H}_2\text{O}} = \frac{0.0699 \text{ g Na}^+}{1000 \text{ g H}_2\text{O}} \times \frac{10^6}{10^6} = \boxed{69.9 \text{ ppm Na}^+}$$

( $6.99 \times 10^{-5} \text{ g Na}^+ / 1 \text{ g H}_2\text{O}$ )  $\times 10^6 / 10^6$

3) What is the conc. of  $0.1 \mu\text{g/L}$  H<sub>2</sub>O of chlordane in ppb & ppt?

$$* \frac{0.1 \mu\text{g}}{1 \text{ L}} \equiv \frac{0.1 \mu\text{g}}{1000 \text{ g}} = \frac{0.1 \mu\text{g}}{(1000 \text{ g} \times \frac{10^6 \mu\text{g}}{\text{g}})} = \boxed{0.1 \text{ ppb}}$$

( $\frac{1}{10^9}$   $\frac{1}{10^{12}}$ )

$$\frac{0.1 \mu\text{g}}{1 \text{ L}} \equiv \frac{0.1 \mu\text{g}}{1000 \text{ g}} = \left( \frac{0.1 \mu\text{g}}{100 \text{ g} \times \frac{10^6 \mu\text{g}}{\text{g}}} \right) \times \frac{10^3}{10^3} = \boxed{100 \text{ ppt}}$$

$10^3 \times 10^6 \times 10^3 = 10^{12}$