Calculating the strength of a mixture of two different concentrations.

**Example 1**

If you mix 100mL of a 5% v/v concentration of drug A with 200mL of a 20% v/v concentration of drug A, what will the final % strength be?

**Method**

**Step 1:** Calculate the amount of drug A in each concentration

\[
\frac{5}{100} \times 100mL = 5mL \quad \& \quad \frac{20}{100} \times 200mL = 40mL
\]

**Step 2:** Add the two amounts together

\[5mL + 40mL = 45mL\]

**Step 3:** Add the two volumes together

\[100mL + 200mL = 300mL\]

**Step 4:** Put total amount over total volume

\[
\frac{45mL}{300mL}
\]
Step 5: Use $c_1/v_1 = c_2/v_2$ to convert to a percentage

\[
\frac{45\, mL}{300\, mL} = \frac{x}{100\, mL}
\]

Step 6: Transpose for $x$ and solve

\[
x = \frac{45 \times 100}{300} = 15\% \, v/v \quad \checkmark
\]

Example 2

You mix 1.2L of a 0.2% w/v solution of drug B with 600mL of a 1 part in 2000 w/v solution of drug B. What will the final % strength be?

Method

Step 1: Calculate the amount of drug B in each concentration

\[
\frac{0.2}{100} \times 1200\, mL = 2.4 \, g \quad \text{and} \quad \frac{1}{2000} \times 600\, mL = 0.3 \, g
\]

Step 2: Add the two amounts together

\[
2.4 \, g + 0.3 \, g = 2.7 \, g
\]

Step 3: Add the two volumes together

\[
1200\, mL + 600\, mL = 1800\, mL
\]

Step 4: Put total amount over total volume

\[
\frac{2.7\, g}{1800\, mL}
\]

Step 5: Use $c_1/v_1 = c_2/v_2$ to convert to a percentage

\[
\frac{2.7\, g}{1800\, mL} = \frac{x}{100\, mL}
\]

Step 6: Transpose for $x$ and solve

\[
x = \frac{2.7 \times 100}{1800} = 0.15\% \, w/v \quad \checkmark
\]

Example 3

You mix 5ml of a 2mg/mL solution of drug C with 10mL of a 0.05% w/v solution of drug C. What will the final strength be in %?

Method

\[
\frac{2\, mg}{mL} \times 5\, mL = 10\, mg \quad \text{and} \quad \frac{0.05}{100} \times 10\, mL = 5\, mg
\]

\[
10\, mg + 5\, mg = 15\, mg \quad \text{and} \quad 5\, mL + 10\, mL = 15\, mL
\]

\[
\frac{15\, mg}{15\, mL} = \frac{100\, mg}{100\, mL} = 0.1\, g = 0.1\% \, w/v \quad \checkmark
\]

Q1

You mix 150mL of a 5% v/v concentration of drug D with 150mL of a 15% v/v concentration of drug D. What will the final % strength be?

Q2

You mix 0.6L of a 0.2% v/v concentration of drug E with 1.2L of a 0.5% v/v concentration of drug E. What will the final % strength be?

Q3

You mix 64mL of a 40% w/v concentration of drug F with 96mL of a 1 part in 8 w/v concentration of drug F. What will the final % strength be?

Q4

You mix 1250mL of a 1 part in 5000 w/v concentration of drug G with 2250mL of a 0.2mg/mL concentration of drug G. What will the final % strength be?

Q5

You add 200mL of a 0.3% v/v concentration of drug H to 600mL of a 1 part in 200 parts concentration of drug H. What will the final strength be in mcL/mL?

Answers

Q1 = 10% v/v. Q2 = 0.4%. Q3 = 23.5% w/v. Q4 = 0.02% w/v. Q5 = 4.5 mcL/mL