

Air, pollution and clean water resources

Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Lab answers

These model answers use the sample data to calculate concentrations and show what each treatment removes. Check your units carefully when converting between cm^3 and dm^3 , and make sure ionic equations balance in charge.

Level: Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** HS-ESS3-6, GCSE C9-C10

Question 1 Dissolved solids

$25 \text{ cm}^3 = 0.025 \text{ dm}^3$. Concentration = $0.875 \div 0.025 = \mathbf{35 \text{ g/dm}^3}$.

Question 2 Mud removed

Mud = $1.075 - 0.875 = \mathbf{0.200 \text{ g}}$ in 25 cm^3 . In 1 dm^3 : $0.200 \div 0.025 = \mathbf{8.0 \text{ g}}$.

Question 3 Fraction of solid that is mud

$0.200 \div 1.075 \times 100 = \mathbf{18.6 \%}$ (about 19 %).

Question 4 Why filtering is not enough

Filtration only removes **insoluble** solids such as soil. Dissolved salt ions are far smaller than the holes in the paper, so they pass through, and the silver nitrate test still gives a precipitate.

Question 5 Silver nitrate test

The ion is **chloride**. $\text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl}(\text{s})$. Sample C gives no precipitate because the salt stays behind in the flask and the distillate has no chloride ions.

Question 6 Chloride concentration

$35 \div 58.5 = \mathbf{0.60 \text{ mol/dm}^3}$.

Question 7 Role of the cold water

Cold water **condenses** the steam back to liquid. Heating to dryness could crack the flask and would carry spray or salt over into the distillate.

Question 8 Evaluate the method

Distillation needs **a lot of energy**, and distilled water lacks the minerals that make water pleasant. Improve the lab by using a **condenser** and repeating the measurements to give a mean.