

How much solute can dissolve in water

Grade 7 science (Year 8 · Class 7) · Test answers (mark scheme)

The model answers show the full reasoning and the way each mark is earned. Give credit for correct science even when the wording differs. Add the marks to check the total of 20.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS1-2

Question 1 Key words (2 marks)

- a. Copper sulfate.
- b. Water.

Marking: 1 mark each.

Question 2 Concentration (3 marks)

- a. Concentration (g/L) = mass of solute (g) ÷ volume of solution (L).
- b. $18 \text{ g} \div 0.45 \text{ L} = \mathbf{40 \text{ g/L}}$.

Marking: 1 mark for the equation; 1 mark for the substitution; 1 mark for 40 g/L.

Question 3 Mass needed (2 marks)

Mass = $25 \text{ g/L} \times 0.60 \text{ L} = \mathbf{15 \text{ g}}$.

Marking: 1 mark for the method; 1 mark for 15 g with unit.

Question 4 Solubility graph (3 marks)

- a. **55 g** per 100 g of water.
- b. $38 \text{ g} \times 2 = \mathbf{76 \text{ g}}$.

Marking: 1 mark for 55 g; 1 mark for doubling; 1 mark for 76 g.

Question 5 Saturated solution (3 marks)

- a. At 20 °C only 25 g dissolves, so $40 - 25 = \mathbf{15 \text{ g}}$ is left.
- b. The solution is saturated.

Marking: 1 mark for using 25 g; 1 mark for 15 g; 1 mark for saturated.

Question 6 Speeding up (2 marks)

Powder has a much larger surface in contact with the water, so more particles are pulled away every second.

Marking: 1 mark for larger surface; 1 mark for more particles pulled away.

Question 7 Crystals (3 marks)

- a. At 80 °C: 78 g; at 40 °C: 38 g. $78 - 38 = \mathbf{40\ g}$.
- b. The cooler water can hold less solute, so the extra comes out as solid.

Marking: 1 mark for the two values; 1 mark for 40 g; 1 mark for the explanation.

Question 8 Spot the mistake (2 marks)

The statement is wrong. A solute with low solubility gives a saturated solution with a low concentration, because only a small mass can dissolve before it is saturated.

Marking: 1 mark for saying the statement is wrong; 1 mark for the reason.