Step-by-Step Solutions & Marking Scheme

CBSE Class 8 Science (Curiosity) — Chapter 9: The Amazing World of Solutes, Solvents, and Solutions

Quick answer key — Section A: 1-(b) 2-(c) 3-(b) 4-(d) 5-(a) 6-(b) 7-(A) 8-(D)

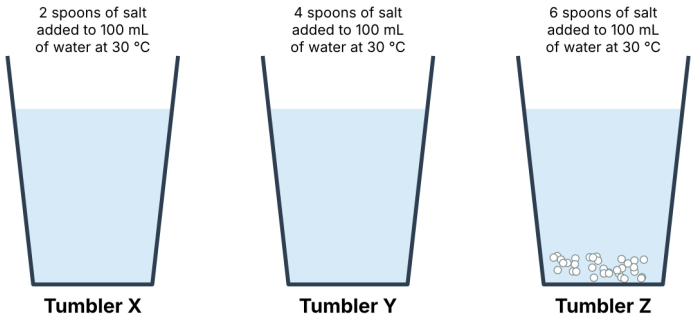
SECTION A — Multiple Choice Questions

1. (b) solvent

When a solid dissolves in a liquid, the solid is the solute and the liquid (water here) is the solvent.

Marking: 1 mark.

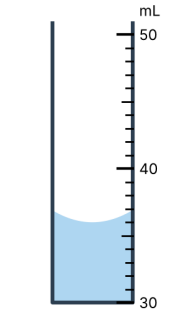
2. Fig. 1 → **(c) Tumbler Z**



Undissolved salt has settled at the bottom of tumbler Z, which means no more salt can dissolve at that temperature: the solution is saturated. In X and Y all the salt has dissolved, so we cannot say they are saturated (they may be unsaturated).

Marking: 1 mark.

3. Fig. 2 → **(b) 36 mL**



Partial view of a measuring cylinder (each small division = 1 mL)

Step 1: Between 30 and 40 there are 10 divisions, so one division = 10 ÷ 10 = 1 mL.

Step 2: The bottom of the meniscus is at 6 divisions above 30 mL, so the reading is 30 + 6 = **36 mL**.

Marking: 1 mark.

4. (d) kg/m^3

Density = mass ÷ volume; the SI unit of mass is kg and of volume is m^3, so the SI unit of density is kg/m^3.

Marking: 1 mark.

5. (a) 2.7 g/cm^3

Density = mass ÷ volume = 54 ÷ 20 = **2.7 g/cm^3**.

Marking: 1 mark.

6. (b) decreases

On heating, the particles move apart, so the volume increases while the mass stays the same; hence density (mass ÷ volume) decreases.

Marking: 1 mark.

7. Assertion–Reason → **(A)**

Step 1: A is true: aquatic animals get less oxygen in warm water.

Step 2: R is true: the solubility of gases such as oxygen decreases as the temperature rises.

Step 3: Less dissolved oxygen is exactly why fish struggle in warm water, so R explains A → (A).

Marking: 1 mark.

8. Assertion–Reason → **(D) A is false but R is true.**

Step 1: A is false: the density of a substance does not depend on the shape or size of the object.

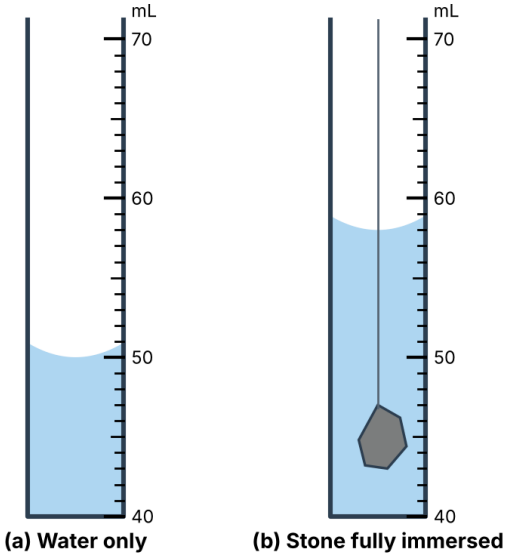
Step 2: R is true: density is the mass present in a unit volume.

Step 3: A false, R true → (D).

Marking: 1 mark.

SECTION B — Short Answer Questions

9. Volume and density of a stone (Fig. 3)



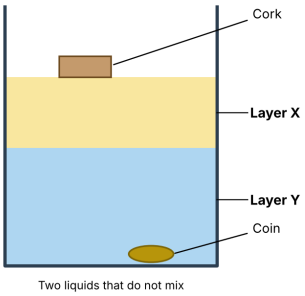
(a) Water only (b) Stone fully immersed

(a) Volume of stone = final level − initial level = 58 − 50 = 8 mL = **8 cm^3**.

(b) Density = mass ÷ volume = 24 ÷ 8 = **3 g/cm^3**.

Marking: (a) 1; (b) 1.

10. Oil and water (Fig. 4)



Two liquids that do not mix

(a) Water is denser, because the oil (layer X) floats on top of the water (layer Y).

(b) The coin sinks because its density is greater than that of water (and of oil).

Marking: 1 mark for each part.

11. Solubility

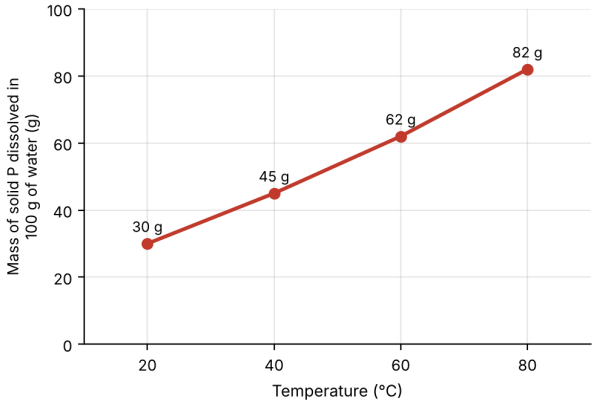
(a) Solubility is the maximum amount of a solute that dissolves in a fixed quantity of solvent (e.g. 100 mL or 100 g) at a particular temperature.

(b) The solubility of most solids **increases** with an increase in temperature.

Marking: (a) 1; (b) 1.

SECTION C — Long Answer Questions

12. Solubility graph (Fig. 5)



(i) 45 g.

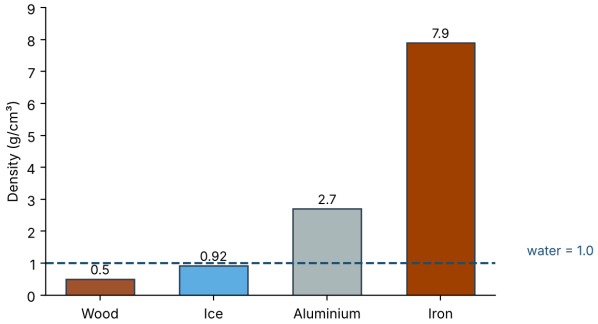
(ii) At 60 °C, 100 g of water dissolves 62 g; so 200 g of water dissolves 2 × 62 = **124 g**.

(iii) At 80 °C: 82 g dissolved; at 40 °C only 45 g can stay dissolved; so 82 − 45 = **37 g** settles out.

(iv) The solubility of P **increases** as the temperature increases.

Marking: 1 mark for each part.

13. Densities (Fig. 6)



(i) Wood and ice (density less than 1 g/cm^3, the density of water).

(ii) Relative density = 2.7 ÷ 1 = **2.7** (no unit).

(iii) Mass = density × volume = 7.9 × 50 = **395 g**.

(iv) When water freezes, its particles arrange so that it occupies more space (expands); the same mass in a larger volume gives a lower density than liquid water, so ice floats.

Marking: 1 mark for each part.

14. Metal block

(i) Volume = l × w × h = 10 × 5 × 4 = **200 cm^3**.

(ii) Density = 540 ÷ 200 = **2.7 g/cm^3**.

(iii) Relative density = 2.7 ÷ 1 = **2.7**.

(iv) It will **sink**, since its density (2.7 g/cm^3) is greater than that of water (1 g/cm^3).

Marking: 1 mark for each part.

15. Reasons

(i) Salt and sugar dissolved in water form a uniform mixture (solution), in which the components are evenly distributed.

(ii) Hot air is less dense than the cooler air around it, so it rises and lifts the balloon.

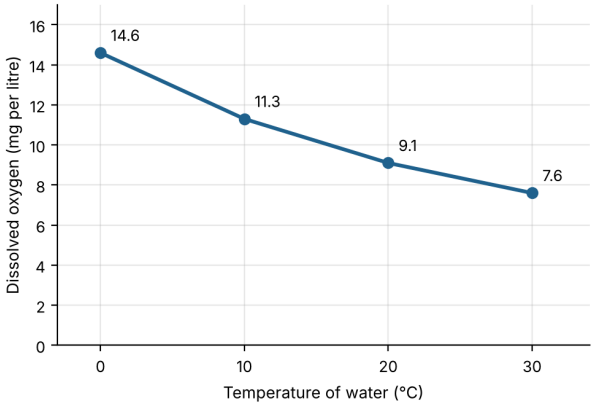
(iii) The solubility of most solids increases with temperature, so a saturated solution becomes unsaturated on heating and dissolves more solute.

(iv) Sawdust is less dense than water and floats; sand is denser than water and sinks.

Marking: 1 mark for each part.

SECTION D — Case-Based / Practical Questions

16. Dissolved oxygen (Fig. 7)



(i) 11.3 mg per litre.

(ii) It **decreases** as the temperature increases.

(iii) A **uniform mixture** (a solution).

(iv) Warm water holds less dissolved oxygen, which is needed to sustain aquatic life.

(v) For most solids, solubility **increases** with temperature, whereas for gases it decreases.

Marking: 1 mark for each part.

17. Oil pack

(i) Density = 910 g ÷ 1000 mL = **0.91 g/mL**.

(ii) It will **float**, since its density (0.91 g/mL) is less than that of water (1 g/mL).

(iii) Relative density = 0.91 ÷ 1 = **0.91**.

(iv) The density **decreases** (the volume increases, the mass is unchanged).

(v) The **100 mL** cylinder: it can measure 70 mL in one step and reads to 1 mL; a 50 mL cylinder needs two steps and a 250 mL cylinder is less accurate (2 mL).

Marking: 1 mark for each part.

Section	A	B	C	D	Total
Marks	8	6	16	10	40

Note: any other correct and relevant answer should be accepted and awarded full marks.