Step-by-Step Solutions & Marking Scheme

CBSE Class 8 Science (Curiosity) — Chapter 7: Particulate Nature of Matter

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

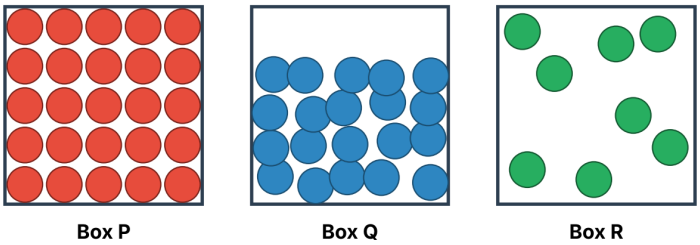
SECTION A — Multiple Choice Questions

1. (b)

In solids the particles are tightly packed with very strong attractions, so they stay in fixed positions and only vibrate (oscillate) about them.

Marking: 1 mark.

2. Fig. 1 → **(b) Box Q**



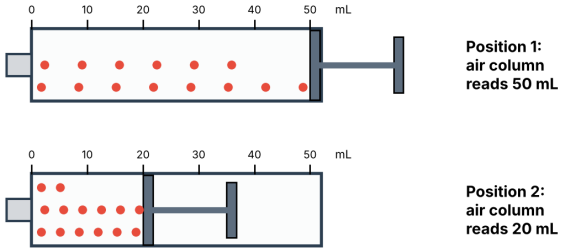
Step 1: Box P: particles tightly packed in a regular pattern → solid (fixed shape and volume).

Step 2: Box Q: particles close together but able to move past each other → liquid (fixed volume, no fixed shape).

Step 3: Box R: particles far apart → gas (no fixed shape or volume).

Marking: 1 mark.

3. Fig. 2 → **(c)**



Pushing the plunger forces the air particles closer, so the volume falls from 50 mL to 20 mL. This is possible only because there are large spaces between gas particles, which can be reduced by pressure. The particles are neither destroyed, made smaller nor stopped.

Marking: 1 mark.

4. (a) melting point

This is the definition of melting point.

Marking: 1 mark.

5. (d) Liquids and gases

Both liquids and gases flow and do not have a fixed shape, so they are called fluids.

Marking: 1 mark.

6. (c)

Air particles are in constant motion; they hit the fragrance particles and help them spread through the whole room.

Marking: 1 mark.

7. Assertion–Reason → **(A)**

Step 1: A is true: a liquid has no fixed shape but a definite volume.

Step 2: R is true: the particles move within a limited space while attractions keep them close.

Step 3: Free movement explains the changing shape and the close packing explains the fixed volume, 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 sugar particles are not destroyed; they separate and spread through the water, so the water still tastes sweet.

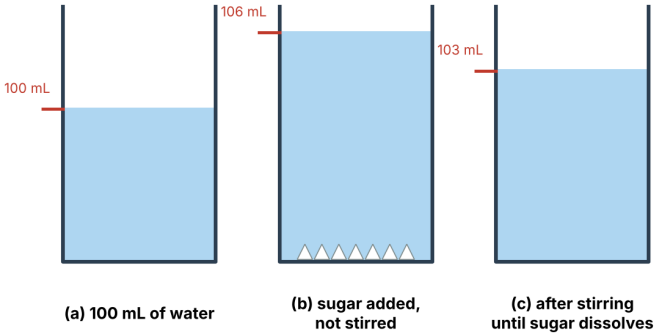
Step 2: R is true: the sugar particles go into the spaces between the water particles.

Step 3: A false, R true → (D).

Marking: 1 mark.

SECTION B — Short Answer Questions

9. Sugar in water (Fig. 3)

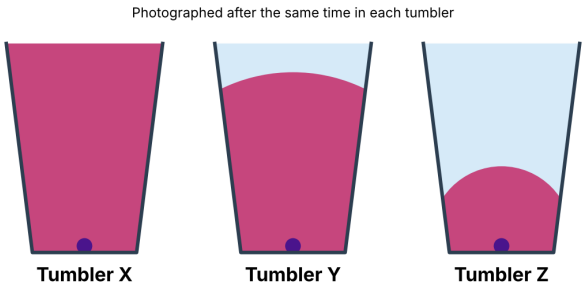


(a) On stirring, the sugar particles separate and go into the spaces between the water particles, so the total volume becomes less than the sum of the volumes of water and sugar.

(b) It shows that there are **interparticle spaces** between the water particles.

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

10. Potassium permanganate (Fig. 4)



(a) Tumbler X (the pink colour has spread the most).

(b) Water particles move faster at a higher temperature, so they spread the potassium permanganate more quickly.

Marking: 1 mark for each part.

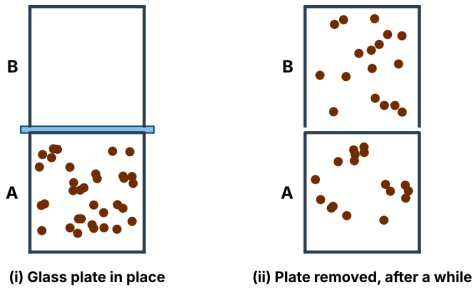
11. Fixed shape and volume of solids

In solids the interparticle attractions are very strong and the particles are tightly packed, held in fixed positions. They can only vibrate and cannot move past one another, so a solid keeps its shape and its volume.

Marking: 1 mark for strong attraction/tight packing; 1 mark for fixed positions/only vibrate.

SECTION C — Long Answer Questions

12. Gas jars (Fig. 5)



(i) The smoke has spread and fills both jars A and B.

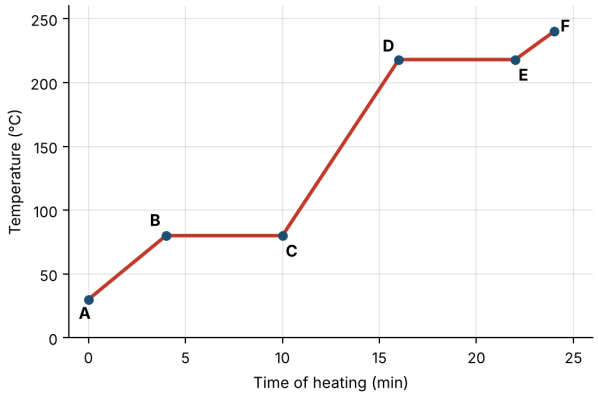
(ii) The particles of a gas move freely in all directions.

(iii) Gases have no fixed volume (they occupy all the available space) and no fixed shape (they take the shape of the vessel).

(iv) No. In a solid the particles are held in fixed positions by strong attractions, so they cannot move away and spread.

Marking: 1 mark for each part.

13. Melting points (Fig. 6)



(i) Iron, since it has the highest melting point (1538 °C), so a lot of energy is needed to overcome the attractions.

(ii) Ice (melting point 0 °C).

(iii) The minimum temperature at which a solid melts to become a liquid at atmospheric pressure.

(iv) The particles vibrate more and more vigorously; at the melting point the vibrations become so vigorous that the particles leave their fixed positions and the attractions weaken, so the solid changes into a liquid.

Marking: 1 mark for each part.

14. Three states of matter

(i) Spacing: minimum in solids, a little more in liquids, maximum in gases.

(ii) Attraction: maximum in solids, slightly weaker in liquids, negligible in gases.

(iii) Movement: only vibration in solids, limited space in liquids, free in all directions in gases.

(iv) Solids: fixed shape and volume; liquids: no fixed shape but fixed volume; gases: no fixed shape or volume.

Marking: 1 mark for each part.

15. Reasons

(i) The sugar breaks up into its constituent particles, which are too small to see but spread through the water and can be tasted.

(ii) The salt breaks up into extremely small particles that occupy the spaces between the water particles.

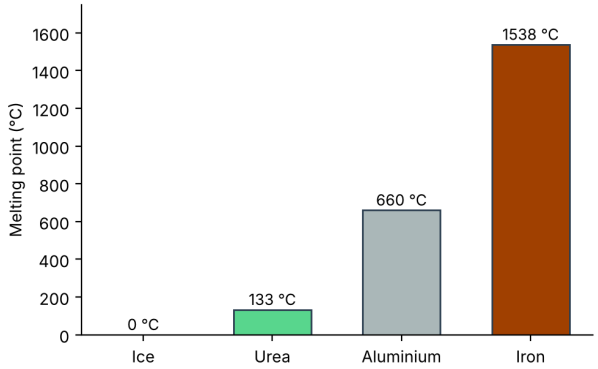
(iii) Milk is a liquid, so its particles can move around and it flows; the glass is a solid, whose particles are held in fixed positions.

(iv) Gas particles move freely and have negligible attractions, whereas solid particles are held in fixed positions by strong attractions.

Marking: 1 mark for each part.

SECTION D — Case-Based / Practical Questions

16. Heating curve (Fig. 7)



(i) 80 °C (the first flat part, B to C).

(ii) 218 °C (the second flat part, D to E).

(iii) Between B and C, S is partly **solid and partly liquid** (it is melting).

(iv) The heat energy is used to overcome the attractions between the particles, not to raise the temperature.

(v) S is a liquid between C and D; its particles move around within a limited space.

Marking: 1 mark for each part.

17. Wax in a candle

(i) Solid, liquid and gas (vapour).

(ii) In the **solid** state.

(iii) In the **gaseous** state (wax vapour).

(iv) The particles vibrate more vigorously.

(v) A **physical change**, because no new substance is formed; only the arrangement and movement of the particles change.

Marking: 1 mark for each part (½ + ½ in (v)).

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.