



1. CHAPTER SNAPSHOT

What are Combined Solids?

A combined solid is formed by joining two or more basic solids.

Key Idea

Volume measures the space occupied by a solid.
For combined solids,
Split → Apply formulas →
Add/Subtract volumes.

BASIC SOLIDS



Cube Cuboid Cone Cylinder Sphere Hemisphere

2. HIGH-YIELD CONCEPTS

- 1 Identify the solids.
- 2 Draw a rough sketch.
- 3 Split the object into known solids.
- 4 Choose the correct volume formula.
- 5 Add or subtract the required volumes.

★ GOLDEN RULE ★

Volume of Combined Solid
= Sum of Individual Volumes –
Removed Volumes (if any)

3. COMPLETE FORMULA BOOK

Solid	Figure	Volume (in cubic units)	Formula description
Cube		a^3	a – side
Cuboid		lbh	l – length b – breadth h – height
Cone		$\frac{1}{3}\pi r^2 h$	r – radius l – slant height $l = \sqrt{r^2 + h^2}$ h – height
Cylinder		$\pi r^2 h$	r – radius h – height
Sphere		$\frac{4}{3}\pi r^3$	r – radius
Hemisphere		$\frac{2}{3}\pi r^3$	r – radius

4. BOARD EXAM FOCUS (HOTSPOTS)



Lollipop (Sphere + Cylinder)

$$V = V_{\text{sphere}} + V_{\text{cylinder}}$$



Circus Tent (Cone + Cylinder)

$$V = V_{\text{cone}} + V_{\text{cylinder}}$$



Glass (Hemisphere + Cylinder)

$$V = V_{\text{hemisphere}} + V_{\text{cylinder}}$$



Capsule (Cylinder + 2 Hemispheres)

$$V = V_{\text{cylinder}} + 2V_{\text{hemisphere}} \\ = \pi r^2 h + \frac{4}{3}\pi r^3$$

PYQ FOCUS

- ★ Capacity
- ★ Application based questions
- ★ Melting & recasting
- ★ Competency based questions
- ★ Metal models

5. EXAM HOTSPOTS

Identify whether to

ADD
Volumes

or

SUBTRACT
Volumes

Common Situations

- Lollipop, Tent, Glass, Capsule
- Toy models
- Water tanks
- Ice cream
- Drilled hole / Hollow object
- Metal melting & recasting
- Real-life application problems

+ ADD

Combine parts
(No material removed)

– SUBTRACT

Something is removed or hollowed out

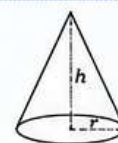
6. SMART REVISION

★ **Rule 1** : Always divide the object into basic solids.

★ **Rule 2** : Use the same units throughout.

★ **Rule 3** : Radius = Diameter ÷ 2

★ **Rule 4** : Cone volume uses height, NOT slant height.



★ **Rule 5** : Capacity = Internal volume.

★ **Rule 6** : Write answer in cubic units (cm³, m³) or litres.



cm³

7. COMMON MISTAKES

- ✗ Using slant height instead of height in cone volume.
- ✗ Using diameter instead of radius.
- ✗ Forgetting cubic units. (cm³, m³ or litres)
- ✗ Mixing TSA formulas with volume formulas.
- ✗ Forgetting to subtract drilled portions or hollow parts.
- ✗ Wrong unit conversion.

Remember : 1000 cm³ = 1 litre

8. VISUAL MEMORY AID – ADD or SUBTRACT?

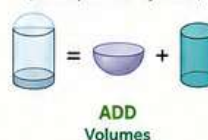
1. LOLLIPOP
(Sphere + Cylinder)



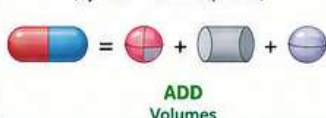
2. CIRCUS TENT
(Cone + Cylinder)



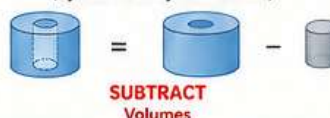
3. GLASS
(Hemisphere + Cylinder)



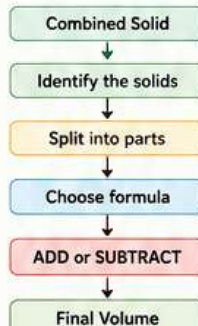
4. CAPSULE
(Cylinder + 2 Hemispheres)



5. DRILLED SOLID (Subtract)
(Cylinder with cylindrical hole)



FLOWCHART



9. RAPID REVISION (30 SECONDS)

- Cube = a^3
- Cuboid = lbh
- Cone = $\frac{1}{3}\pi r^2 h$
- Cylinder = $\pi r^2 h$
- Sphere = $\frac{4}{3}\pi r^3$
- Hemisphere = $\frac{2}{3}\pi r^3$

- ✓ Split into basic solids
- ✓ Add or subtract volumes
- ✓ Use same units
- ✓ Radius = Diameter ÷ 2

- ✓ Cone uses height (h)
- ✓ Write cubic units or litres

cm³



10. KEY TAKEAWAY

For every combined solid:
Identify the solids → Split into known shapes
→ Choose the correct volume formulas →
Add or subtract the individual volumes →
Write the answer in cubic units (or litres,
if required).

PRACTICE • THINK • SCORE!

