MATHS WITHOUT GUESSWORK · BOARD BOOSTER

Surface Areas & Volumes

LOCK THE SURE MARKS.
STRETCH FOR THE TOP.
PRACTISE THE BOARD WAY.

A board-exam practice companion for **CBSE Class 10 Mathematics**
Syllabus session 2026–27 · Standard (041)

🛡️ Secure Track | 🚀 Stretch Track | ~88 questions + 3 mini-mocks

Built around one idea — combine two solids

Combine	Add / Sub	CSA / TSA
join any two basic solids	add or subtract the volumes	pick the surface that's exposed

Original questions and solutions. Answers kept separate. Not a substitute for the NCERT textbook or your teacher.

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Surface Areas & Volumes in the board paper

Know exactly how many marks are really at stake here — so you spend your effort where the paper pays.

◆ UNDERSTAND THE OFFICIAL NUMBER This chapter sits inside **Unit VI — Mensuration, worth 10 marks**, shared with Areas Related to Circles. Surface Areas & Volumes is a **reliable 5–6 marks** — almost always **one long-answer combination-of-solids question** (surface area or volume of a joined/scooped solid) plus a 1–2 mark formula recall. CBSE publishes weightage per unit, not per chapter.

Where those marks usually fall (PYQ trend — based on past papers, not official)

Form it takes	Typical marks	What it tests
1–2 MCQ / Assertion-Reason	1–2	A formula, slant height, which surface to use
A VSA or SA	2–3	SA or volume of one combination; a scooped solid
A 5-mark LA	5	A toy, tent, capsule, rocket — full SA and/or volume
A case study	4	An ice-cream cone, a silo, a medicine capsule

★ SPOT THE CLUE WHAT'S IN THE 2026–27 SCOPE In scope: **surface area and volume of combinations of any two** of the cube, cuboid, cylinder, cone, sphere and hemisphere. **Out of scope (deleted):** the **frustum of a cone** and **melting / recasting** one solid into another. If a problem needs three solids or a bucket-shaped frustum, it is *not* on the 2026–27 paper.

Q7 The TSA of a solid hemisphere of radius 7 cm is: A. 154 cm^2 B. 308 cm^2 C. 462 cm^2 D. 616 cm^2

1 PART-GUIDED ★

Q8 The volume of a cube of side 4 cm is: A. 16 cm^3 B. 48 cm^3 C. 64 cm^3 D. 96 cm^3

1 GUIDED

Q9 The curved surface area of a hemisphere of radius r is: A. πr^2 B. $2\pi r^2$ C. $3\pi r^2$ D. $4\pi r^2$

1 GUIDED ★

Q10 A toy is a cone mounted on a hemisphere of the same radius. Which surface is NOT part of its outer area? A. CSA of the cone B. CSA of the hemisphere C. the circular face where they join D. none

1 PART-GUIDED ★

Q11 The volume of a hemisphere of radius 3 cm (π = 3.14) is: A. 18.84 cm^3 B. 56.52 cm^3 C. 113.04 cm^3 D. 28.26 cm^3

1 PART-GUIDED

Q12 A capsule is a cylinder with a hemisphere at each end (radius r, cylinder length h). Its total surface area is: A. $2\pi rh + 2\pi r^2$ B. $2\pi rh + 4\pi r^2$ C. $2\pi rh$ D. $\pi r^2 h + 4\pi r^2$

1 INDEPENDENT ★

Q13 To find the canvas needed for a conical tent you compute its: A. volume B. total surface area C. curved surface area D. base area

1 PART-GUIDED ★

Q14 When two solids are joined to form one solid, the volume of the combination equals: A. their difference B. the sum of the two volumes C. their product D. their average

1 GUIDED ★

Q15 A cone of radius 7 cm and height 24 cm has slant height: A. 25 cm B. 24 cm C. 31 cm D. 7 cm

1 PART-GUIDED ★

Q16 The surface area of a sphere of radius 7 cm is: A. 154 cm^2 B. 308 cm^2 C. 462 cm^2 D. 616 cm^2

1 PART-GUIDED ★

Q17 The total surface area of a cube of side 10 cm is: A. 100 cm^2 B. 600 cm^2 C. 1000 cm^2 D. 60 cm^2

1 GUIDED

Q18 A sphere and a cylinder have the same radius, and the cylinder's height equals the sphere's diameter. The ratio (volume of sphere : volume of cylinder) is: A. 1 : 1 B. 2 : 3 C. 3 : 2 D. 4 : 3

1 INDEPENDENT ★

Q19 The quantity of liquid a hemispherical bowl of radius r can hold is: A. $2\pi r^2$ B. $3\pi r^2$ C. $\frac{2}{3}\pi r^3$ D. $4/3\ \pi r^3$

1 GUIDED

Q20 Two cubes of side 6 cm are joined end to end. The resulting cuboid measures: A. 12 × 6 × 6 B. 6 × 6 × 6 C. 18 × 6 × 6 D. 12 × 12 × 6

1 PART-GUIDED ★

Q21 Two cubes of side 6 cm joined end to end have surface area: A. 432 cm^2 B. 360 cm^2 C. 720 cm^2 D. 216 cm^2

1 INDEPENDENT ★

Q22 A cone and a hemisphere have equal bases and equal heights. The ratio of their volumes (cone : hemisphere) is: A. 1 : 1 B. 1 : 2 C. 2 : 1 D. 1 : 3

1 INDEPENDENT ★

Very Short Answer (2-mark) set

16 two-mark questions. Write the formula, put in the numbers, give units. Worked solutions in the Answer Key. Use π = 22/7 unless told otherwise.

Q1 Find the total surface area of a solid hemisphere of radius 7 cm.

2 GUIDED ★

Q2 A cone has radius 7 cm and height 24 cm. Find its slant height.

2 GUIDED ★

Q3 Find the volume of a cone of radius 7 cm and height 6 cm.

2 PART-GUIDED ★

Q4 Find the curved surface area of a cone of radius 7 cm and slant height 25 cm.

2 PART-GUIDED ★

Q5 A toy is a cone of radius r mounted on a hemisphere of the same radius; the cone's height is h. Write the formula for its volume.

2 INDEPENDENT

Q6 Find the curved surface area of a cylinder of radius 7 cm and height 10 cm.

2 GUIDED ★

Q7 Two cubes of side 5 cm are joined end to end. Find the length of the resulting cuboid.

2 GUIDED

Case studies (4-mark)

8 source-based cases, each 1 + 1 + 2 marks. Name the two solids first, then compute. Solutions in the Answer Key. Use π = 22/7 unless told otherwise.

Case 1 — The ice-cream cone

4 marks

An ice cream is a cone of radius 3.5 cm and height 12 cm, with a hemispherical scoop of the same radius on top.

(i) Name the two solids that make up the ice cream.

1

(ii) Find the volume of the cone part.

1

(iii) Find the total volume of ice cream (cone + hemisphere).

2

Answer Key

Kept at the back on purpose — so a parent needn't teach. The recurring methods are written out once; the drills get the key step, the answer and the likely slip.

Model methods (learn these once)

Combination — surface area. Add only the *exposed* surfaces; the circle(s) where two solids meet are hidden. *Toy (cone + hemisphere):* TSA = CSA cone + CSA hemisphere = $\pi rl + 2\pi r^2$. *Capsule (cylinder + 2 hemispheres):* TSA = $2\pi rh + 4\pi r^2$. *Tent (cylinder + cone):* canvas = $2\pi rh + \pi rl$. Always find $l = \sqrt{(r^2 + h^2)}$ first. **The mark is for dropping the hidden face.**

Combination — volume. Joined ⇒ add: toy = $\frac{1}{3}\pi r^2h + \frac{2}{3}\pi r^3$; rocket/silo = $\pi r^2h + \frac{1}{3}\pi r^2h'$. Scooped ⇒ subtract: cone out of a cylinder leaves $\pi r^2h - \frac{1}{3}\pi r^2h = \frac{2}{3}\pi r^2h$; hemisphere out of a cube leaves $a^3 - \frac{2}{3}\pi r^3$.

Scooped surface. When a hemisphere is cut from a face, the flat disc of radius r is removed ($-\pi r^2$) and the curved wall is added ($+2\pi r^2$), a net gain of $+\pi r^2$. So a cube with a hemispherical pit of radius r: surface = $6a^2 + \pi r^2$.

Choosing π. If r is a multiple of 7, use $22/7$ and keep it as a fraction; otherwise use 3.14. Area → cm²/m², volume → cm³/m³, capacity → litres (1000 cm³ = 1 L).

Section 6 — MCQ & Assertion-Reason

Q	Ans	Why
Q1	**B**	Volume of a sphere = $4/3\ \pi r^3$.

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