

Surface Areas and Volumes

Quick Study Guide

HOW TO USE THIS GUIDE

HIGHLIGHTED TEXT SHOWS IMPORTANT POINTS

- ★ MARKS HIGH-FOCUS TOPICS
- 📄 INDICATES EXAM TIPS
- ⚠️ SHOWS COMMON ERRORS
- 💡 GIVES QUICK TIPS

BASIC CONCEPTS

Mnemonic: "SHAPE BOSS"

- S** - Surface area
H - Height important
A - Area total
P - Parts add
E - External area
B - Base area
O - Outside area
S - Sum all faces
S - Simple addition

Remember As:

DABBA GAME

- * CSA = Curved Surface Area
- * Like: Dabba wrapping
- * TSA = Total Surface Area
- * Like: Full box cover
- * Volume = Space inside
- * Like: Dabba capacity

Common Errors

- * Base missing
- * Height confusion
- * π value wrong
- * Units mismatch

CUBE & CUBOID

Mnemonic: "BOX WALA"

- B** - Base area
O - Outside faces
X - X, Y, Z sides
W - Width $\times$ Length
A - Add all faces
L - Length $\times$ height
A - Area total

QUICK FORMULA:

DABBA SIZE:

- Cube:
 * Edge length = a
 * TSA = $6a^2$
 * Volume = a^3

Cuboid:

- * TSA = $2(lb + bh + hl)$
- * Volume = $l \times b \times h$
- * Like: Room size

CYLINDER

Mnemonic: "PIPE LINE"

- P** - Pi value use
I - Into radius
P - Proper height
E - Easy calc

- L** - Length of pipe
I - Important radius
N - Note formula
E - Easy volume

REMEMBER AS:

CLASS FULL:

- * CSA = $2\pi rh$
- * Like: Paper wrap
- * TSA = $2\pi r(h + r)$
- * Like: Full glass wrap
- * Volume = $\pi r^2 h$
- * Like: Water capacity

REMEMBER AS:

CHAKKAR LINE:

- * $r = 7\text{cm}$, $h = 14\text{cm}$
- * CSA = $2 \times 22/7 \times 7 \times 14$
- * = 616 cm^2

CONE

Mnemonic: "SAMOSA MATH"

- S** - Slant height (l)
A - Area curved
M - Multiple parts
O - One base
S - Simple formulas
A - Area total

REMEMBER AS:

- * $l^2 = h^2 + r^2$
- * l = slant height
- * h = height
- * r = radius

QUICK RULES:

ICE CREAM:

- * CSA = πrl
- * Like: Cone wrapping
- * TSA = $\pi r(l + r)$
- * Like: Total paper
- * Volume = $\frac{1}{3}\pi r^2 h$
- * Like: Ice cream space

: SPHERE & HEMISPHERE

Mnemonic: "BALL GAME"

- B** - Ball complete
A - Area formula
L - Look for radius
L - Learn formulas

- G** - Get radius
A - Area surface
M - Multiply right
E - Easy solve

REMEMBER AS FORMULA:

GOLA GAME

Sphere:

- * TSA = $4\pi r^2$
- * Like: Ball surface
- * Volume = $(4/3)\pi r^3$
- * Like: Ball space

Hemisphere:

- * CSA = $2\pi r^2$
- * TSA = $3\pi r^2$
- * Volume = $(2/3)\pi r^3$

COMBINATION PROBLEMS

Mnemonic: "MIXED BOSS"

- M** - Multiple shapes
I - Into one
X - X out extras
E - Easy parts
D - Divide work

- B** - Break into parts
O - One by one
S - Solve each
S - Sum up all

SOLVING STEPS:

BREAK KARO:

1. Split shapes
2. Find each part
3. Add/Subtract
4. Final answer

EXAMPLE:

- * Cylinder + Cone
- * Calculate separately
- * Then combine
- * Check units



CONVERSION OF SOLIDS

Mnemonic: "CHANGE GAME"

- C** - Convert shape
H - Height changes
A - Area new
N - Note volume
G - Get ratio
E - Equal volume

IMPORTANT STEPS:

SAME VOLUME

- * Volume remains same
- * Height changes
- * Radius adjusts
- * Ratio important

EXAMPLE:

- * Cube $\rightarrow$ Cylinder
- * Same volume
- * Find new dimensions

QUICK REVISION CHECKLIST

Before Exam:

- ✓ Basic formulas
- ✓ Shape properties
- ✓ Surface areas
- ✓ Volumes
- ✓ Combinations
- ✓ Conversions
- ✓ Units

Scoring Tips:

1. Draw neat diagrams
2. Show all steps
3. Write formulas
4. Check units
5. Verify answers

100%

HIGH FOCUS AREAS

1. Basic Concepts (5 marks)
2. Cube & Cuboid (5 marks)
3. Sphere/Hemisphere (5 marks)
4. Cylinder/Cone (4 marks)
5. Combinations (4 marks)

QUICK FORMULAS

Mnemonic: "FORMULA KING"

FORMULA KING:

Shape | CSA | TSA | Volume

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Cube | $4a^2$ | $6a^2$ | a^3

Cuboid | $2h(l+b)$ | $2(lb+bh+hl)$ | $l \times b \times h$

Cylinder | $2\pi rh$ | $2\pi r(h+r)$ | $\pi r^2 h$

Cone | πrl | $\pi r(l+r)$ | $\frac{1}{3}\pi r^2 h$

Sphere | - | $4\pi r^2$ | $(\frac{4}{3})\pi r^3$

Hemisphere | $2\pi r^2$ | $3\pi r^2$ | $(\frac{2}{3})\pi r^3$

UNIT CONVERSION:

- * cm^3 to m^3 : $\div 1000000$
- * m^3 to cm^3 : $\times 1000000$
- * Remember square vs cube

GOOD LUCK!

