UDAAN

2026

Surface Area and Volumes

MATHS LECTURE-1

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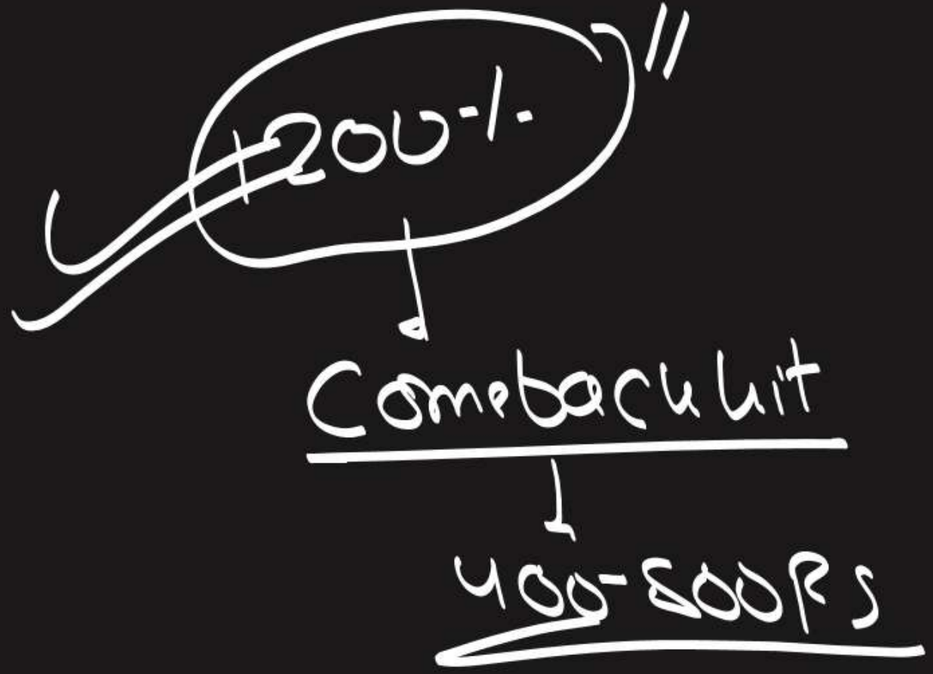
Topics *to be covered*

A All formulas

B Basics Questions



CBSE 2025 Questions

35. The following table shows the number of patients of different age group who were discharged from the hospital in a particular month :

Age (in years)	Number of Patients Discharged
5-15	6
15-25	11
25-35	21
35-45	23
45-55	14
55-65	5
Total	80

Find the 'mean' and the 'mode' of the above data.

4. The population of lions was noted in different regions across the world in the following table : 5

Number of lions	Number of regions
0 – 100	2
100 – 200	5
200 – 300	9
300 – 400	12
400 – 500	x
500 – 600	20
600 – 700	15
700 – 800	9
800 – 900	y
900 – 1000	2
	100

If the median of the given data is 525, find the values of x and y.

12. The cumulative frequency for calculating median is obtained by adding the frequencies of all the : 1
(a) classes up to the median class
(b) classes following the median class
(c) classes preceding the median class
(d) all classes

13. If mean and median of given set of observations are 10 and 11 respectively, then the value of mode is : 1
(a) 10.5 (b) 8 (c) 13 (d) 21

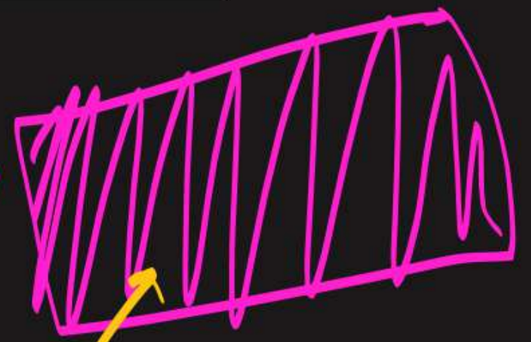
6. If the mode of some observations is 10 and sum of mean and median is 25, then the mean and median respectively are 1
(A) 12 and 13 (B) 13 and 12
(C) 10 and 15 (D) 15 and 10

7. If the maximum number of students has obtained 52 marks out of 80, then 1
(A) 52 is the mean of the data. (B) 52 is the median of the data.
(C) 52 is the mode of the data. (D) 52 is the range of the data.

Key Words

SURFACE AREA

The amount of space covering the outside of a three-dimensional shape.



VOLUME

The amount of space occupied by a three-dimensional object.

Space covered = $l \times b$ = $5 \times 2 = 10 m^2$ / 10 Sq.m.

Area

Cuboid → 6 Rectangular Surface.

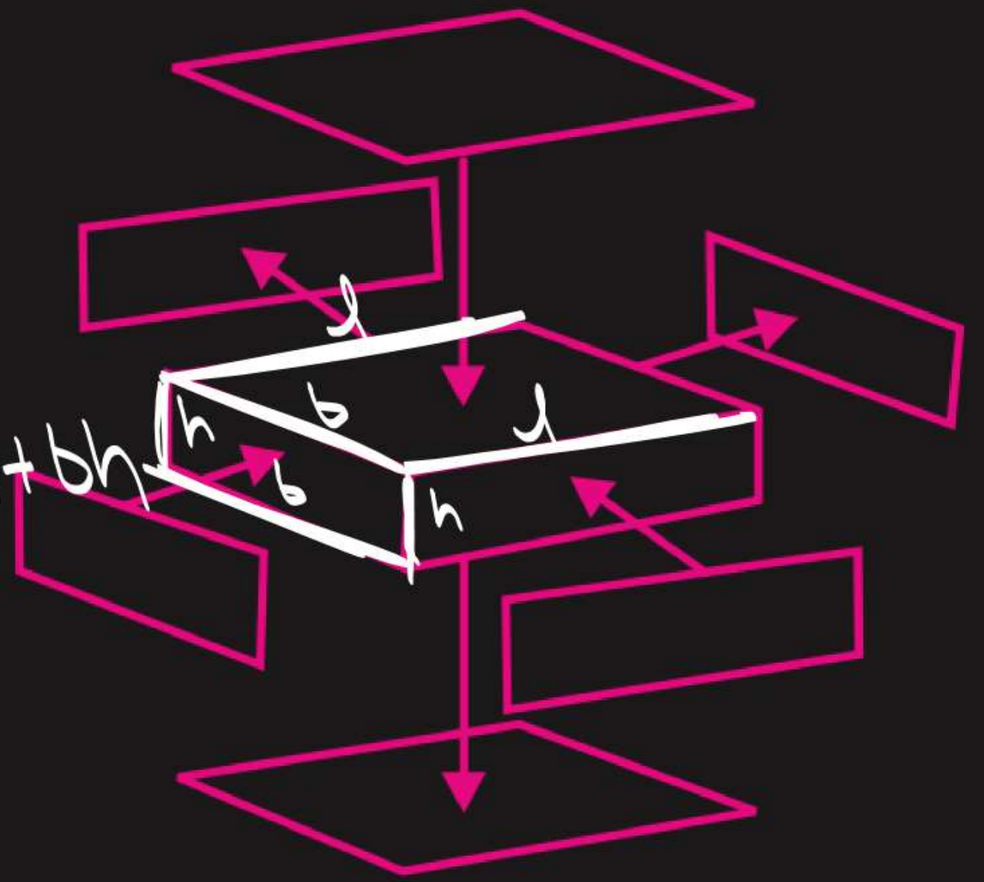
8 Vertex | 12 Edges | 6 Surface

T.S.A = 6 · Surface milkar kitna space cover hota hai

Main = $lb + lb + lh + lh + bh + bh$

$= 2lb + 2lh + 2bh$

$= \boxed{2[lb + bh + lh]}$



L.S.A / Area of four walls $= 2lh + 2bh = \boxed{2h(l+b)}$

Some Useful Formulae

CUBOID

Let l, b and h denote respectively the length, breadth and height of a cuboid. Then,

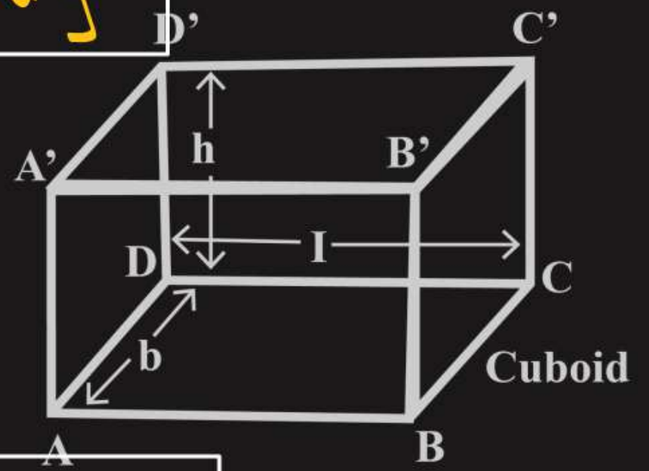
(i) Total surface area of the cuboid = $2[lb+bh+hl]$

(ii) Volume of the cuboid = $l \times b \times h$

(iii) Diagonal of the cuboid = $\sqrt{l^2+b^2+h^2}$

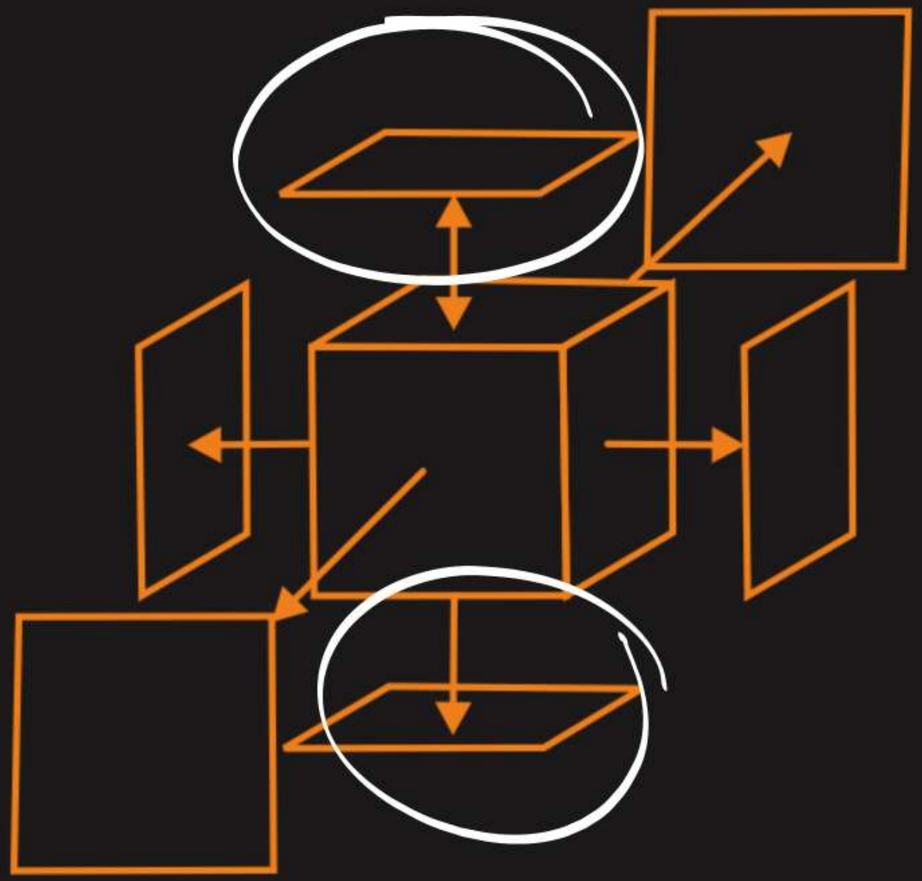
(iv) Area of four walls of a room = $2h[l+b]$

= Perimeter of base × height



S.A = Sq. units

Vol. = Cu. units.



Some Useful Formulae

CUBE

→ cuboid = $l = b = h = a$

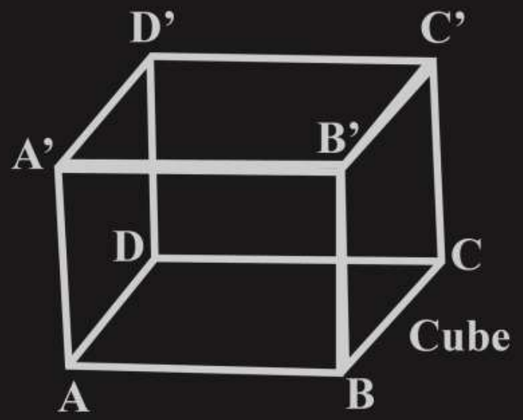
If the length of each edge of a cube is 'a' units, then

(i) Total surface area of the cube = $\boxed{6a^2}$

(ii) Volume of the cube = $l \times b \times h = a \times a \times a = \boxed{a^3}$

(iii) Diagonal of the cube = $\sqrt{l^2+b^2+h^2} = \sqrt{a^2+a^2+a^2} = \sqrt{3a^2} = \boxed{\sqrt{3}\,a}$

(iv) lateral surface area = $\boxed{4a^2}$



Cube

Some Useful Formulae

RIGHT CIRCULAR CYLINDER

For a right circular cylinder of base radius r and height (or length) h, we have

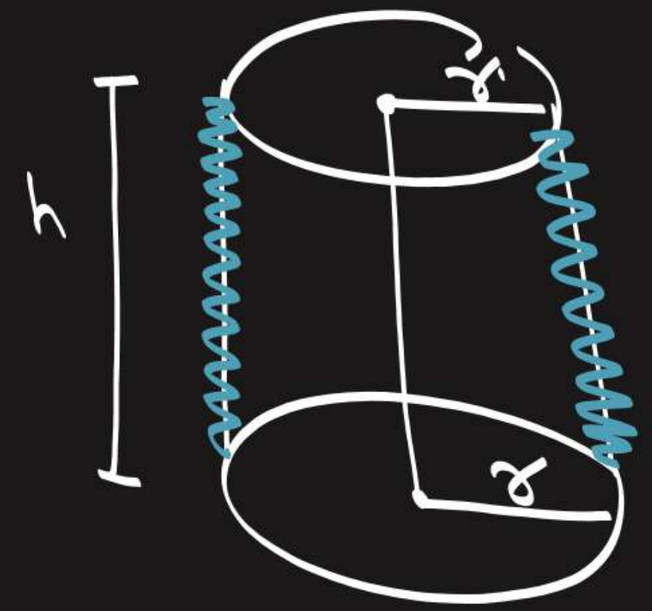
(i) Area of each end = Area of base = πr^2

(ii) Curved surface area = $2\pi rh$

(iii) Total surface area = $\pi r^2 + \pi r^2 + 2\pi rh$

$= 2\pi r^2 + 2\pi rh = 2\pi r[r+h]$

(iv) Volume = $\pi r^2 h$



Some Useful Formulae

RIGHT CIRCULAR CONE

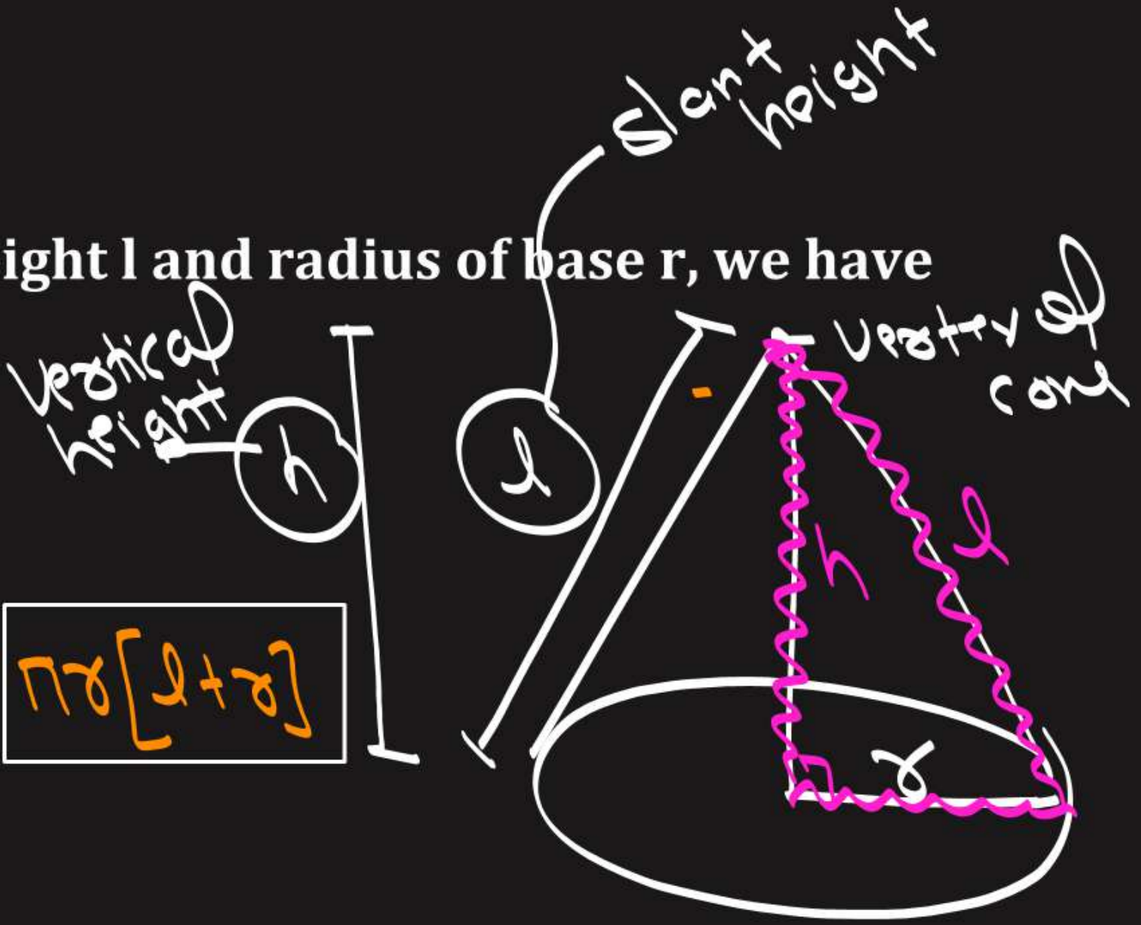
For a right circular cone of height h, slant height l and radius of base r, we have

(i) $l^2 = r^2 + h^2$

(ii) Curved surface area = $\pi r l$

(iii) Total surface area = $\pi r l + \pi r^2 = \pi r [l + r]$

(iv) Volume = $\frac{1}{3}\pi r^2 h$



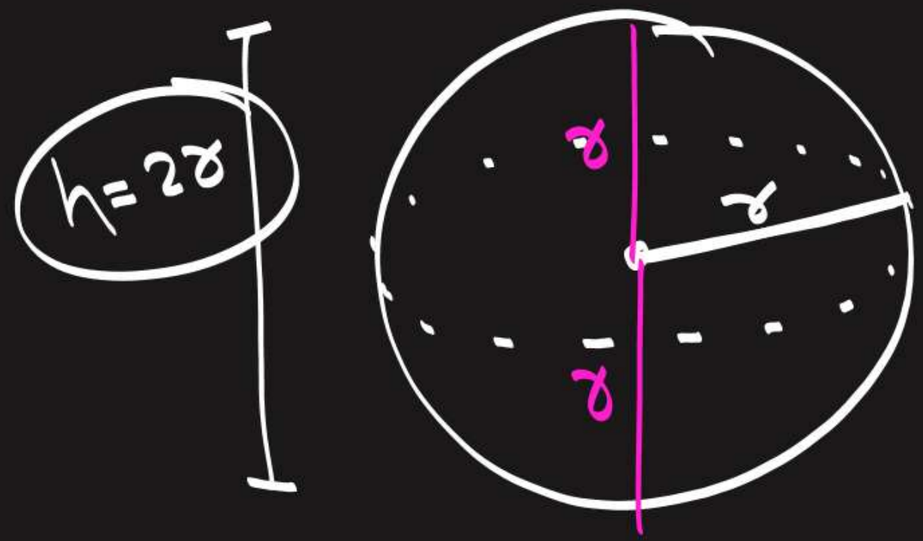
Some Useful Formulae

SPHERE

For a sphere of radius r, we have

(i) Surface area = C.S.A = T.S.A = $4\pi r^2$

(ii) Volume = $\frac{4}{3}\pi r^3$

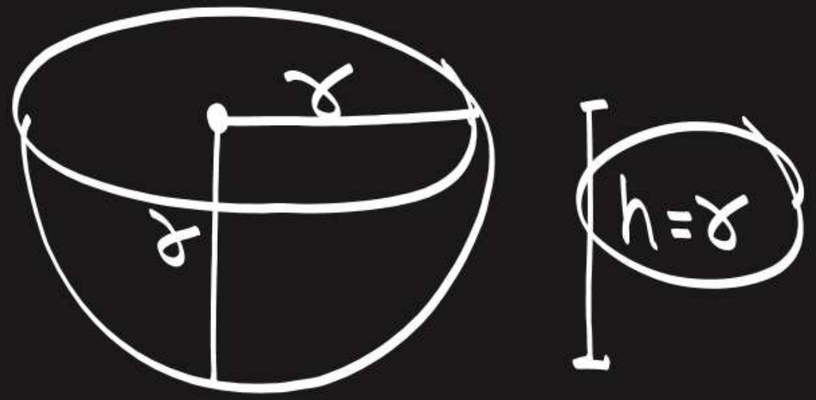


For a **HEMISPHERE** of radius r, we have

(i) Curved Surface area = $2\pi r^2$

(ii) Total surface area = $2\pi r^2 + \pi r^2 = 3\pi r^2$

(iii) Volume = $\frac{2}{3}\pi r^3$



Name of Solid	Volume	Total Surface Area	Lateral Surface Area
Cube	$V = a^3$	$TSA = 6a^2$	$LSA = 4a^2$
Cuboid	$V = l \times b \times h$	$TSA = 2(lb + bh + hl)$	$LSA = 2h\,(l + b)$
Cylinder	$V = \pi r^2 h$	$TSA = 2\pi r\,(h + r)$	$CSA = 2\pi rh$
Cone	$V = \frac{1}{3}\pi r^2 h$	$TSA = \pi r(l + r)$	$CSA = \pi rl$
Sphere	$V = \frac{4}{3}\pi r^3$	$TSA = 4\,\pi r^2$	$CSA = 4\,\pi r^2$
Hemisphere	$V = \frac{2}{3}\pi r^3$	$TSA = 3\,\pi r^2$	$CSA = 2\,\pi r^2$

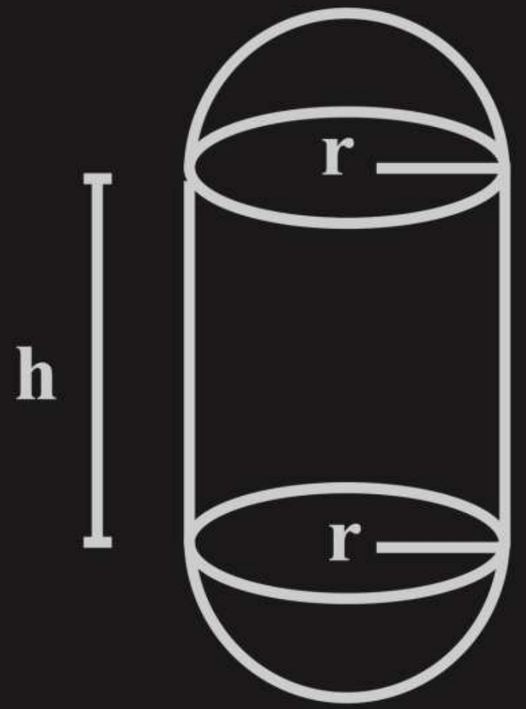
#Q. T.S.A. = ?

$= C.S.A_{cylinder} + C.S.A_{hemi} + C.S.A_{hemi}$

$= 2\pi rh + 2\pi r^2 + 2\pi r^2$

$= 2\pi rh + 4\pi r^2$

$= 2\pi r[h + 2r]$

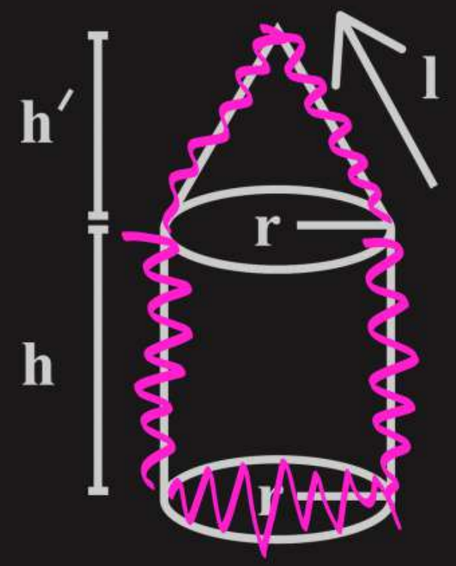


#Q. T.S.A. = ?

$= C.S.A_{cone} + C.S.A_{cylinder} + \text{base area}$

$= \pi r l + 2\pi r h + \pi r^2$

$= \boxed{\pi r [l + 2h + r]}$

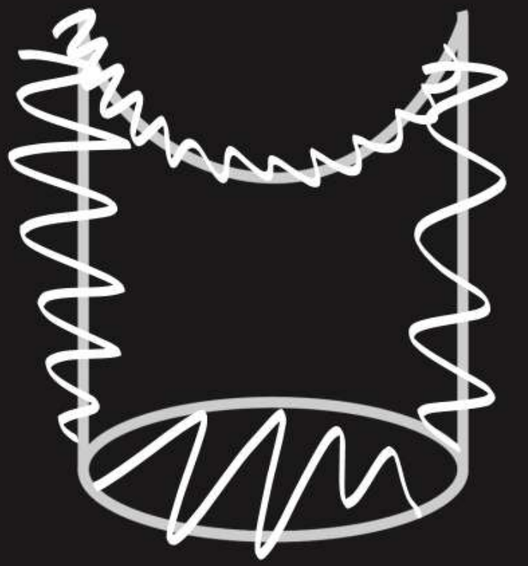


#Q. T.S.A. = ?

$= \pi r^2 + 2\pi rh + 2\pi r^2$

$= 3\pi r^2 + 2\pi rh$

$= \boxed{\pi r[3r + 2h]}$

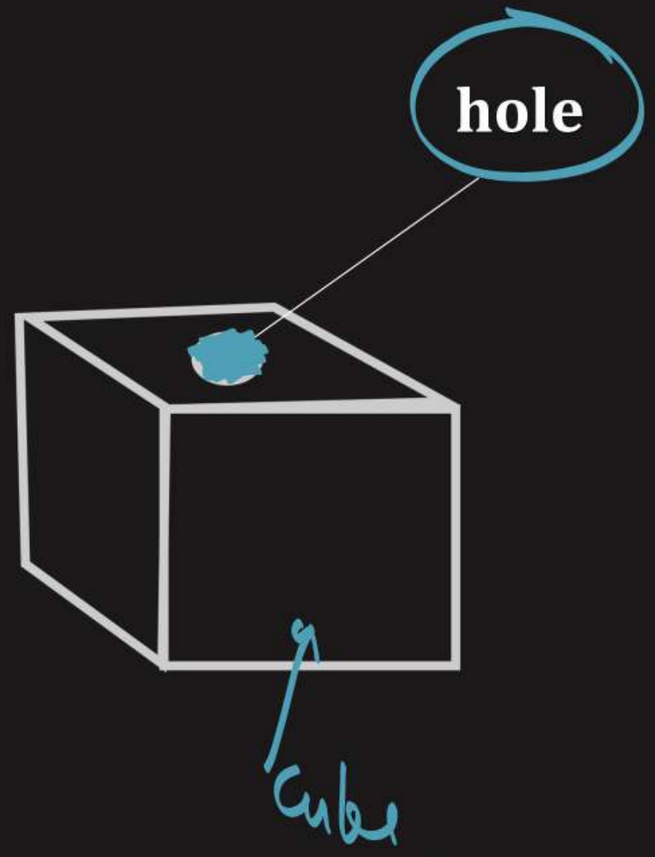


= Space covered

$= \boxed{lb - \pi r^2}$

#Q. T.S.A. = ?

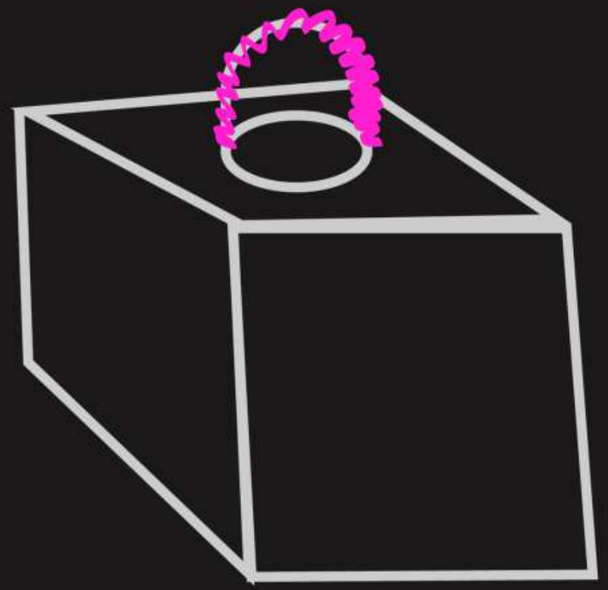
T.S.A cube - πr^2



T.S.A cuboid $- \cancel{D\theta^2} + C.S.A_{cylind.} + \cancel{D\theta^2}$

#Q. T.S.A. = ?

T.S.A. of cube − base area of hemisphere + C.S.A. of hemi



#Q. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.

CBSE 2014, 18

$h = 10\,cm$

$r = 3.5\,cm = \frac{35}{10}$

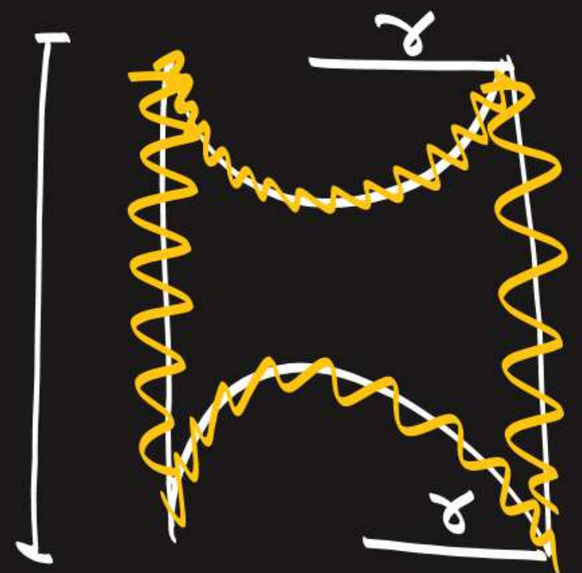
$TSA = 2 \times C.S.A_{hemi} + C.S.A_{cyl.}$

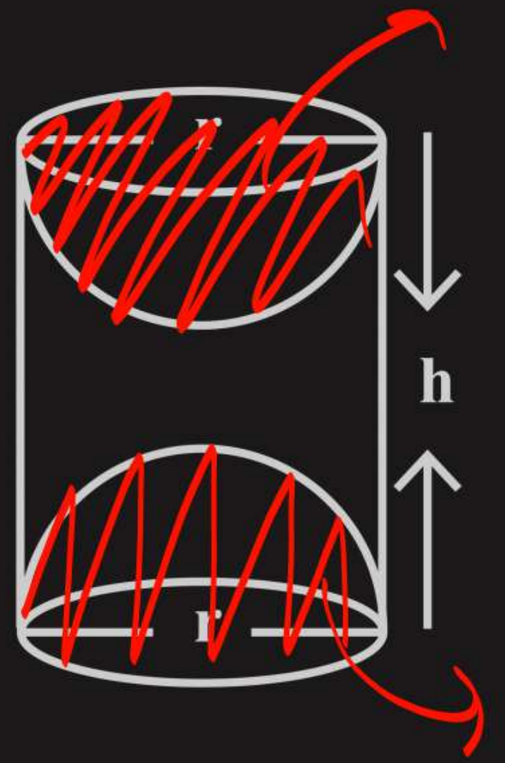
$= 2 \cdot [2\pi r^2] + 2\pi r h$

$= 4\pi r^2 + 2\pi r h$

$= 2\pi r [2r + h]$

$= 2 \times \frac{22}{7} \times \frac{35}{10} \left[2 \cdot \frac{35}{10} + 10\right] = 22 \times 17 = \boxed{374\,cm^2 / 59.cm}$





#Q. From a solid circular cylinder with height 10 cm and radius of the base 6 cm, a right circular cone of the same height and same base is removed. Find the whole surface area.

CBSE 2009, 12, 17

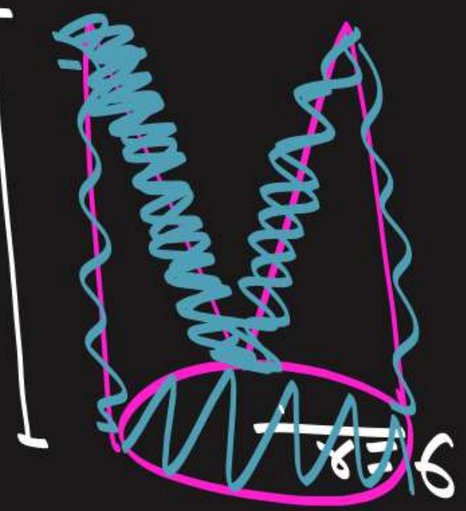
$T.S.A = \pi r^2 + 2\pi rh + C.S.A_{cone}$

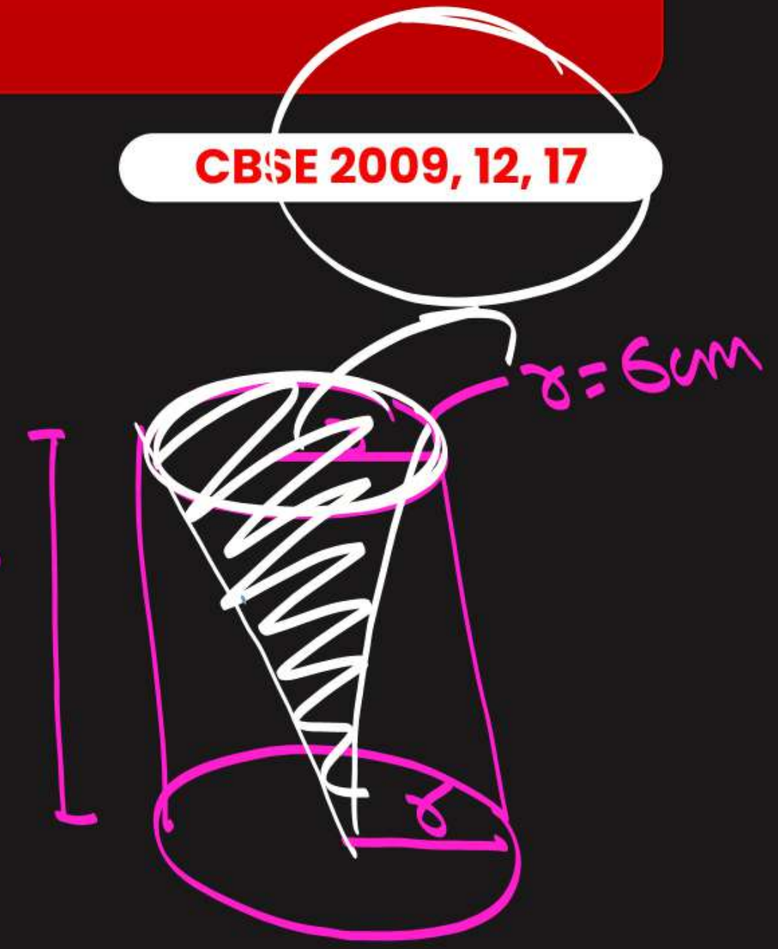
$= \pi r^2 + 2\pi rh + \pi rl$

$= \pi r[r + 2h + l]$

$= \frac{22}{7} \cdot 6\left[6 + 2(10) + \sqrt{136}\right]$

$= \boxed{\frac{22 \cdot 6}{7}\left[26 + \sqrt{136}\right]}$ cm^2





$$l^2 = h^2 + r^2$$

$$l^2 = (10)^2 + (6)^2$$

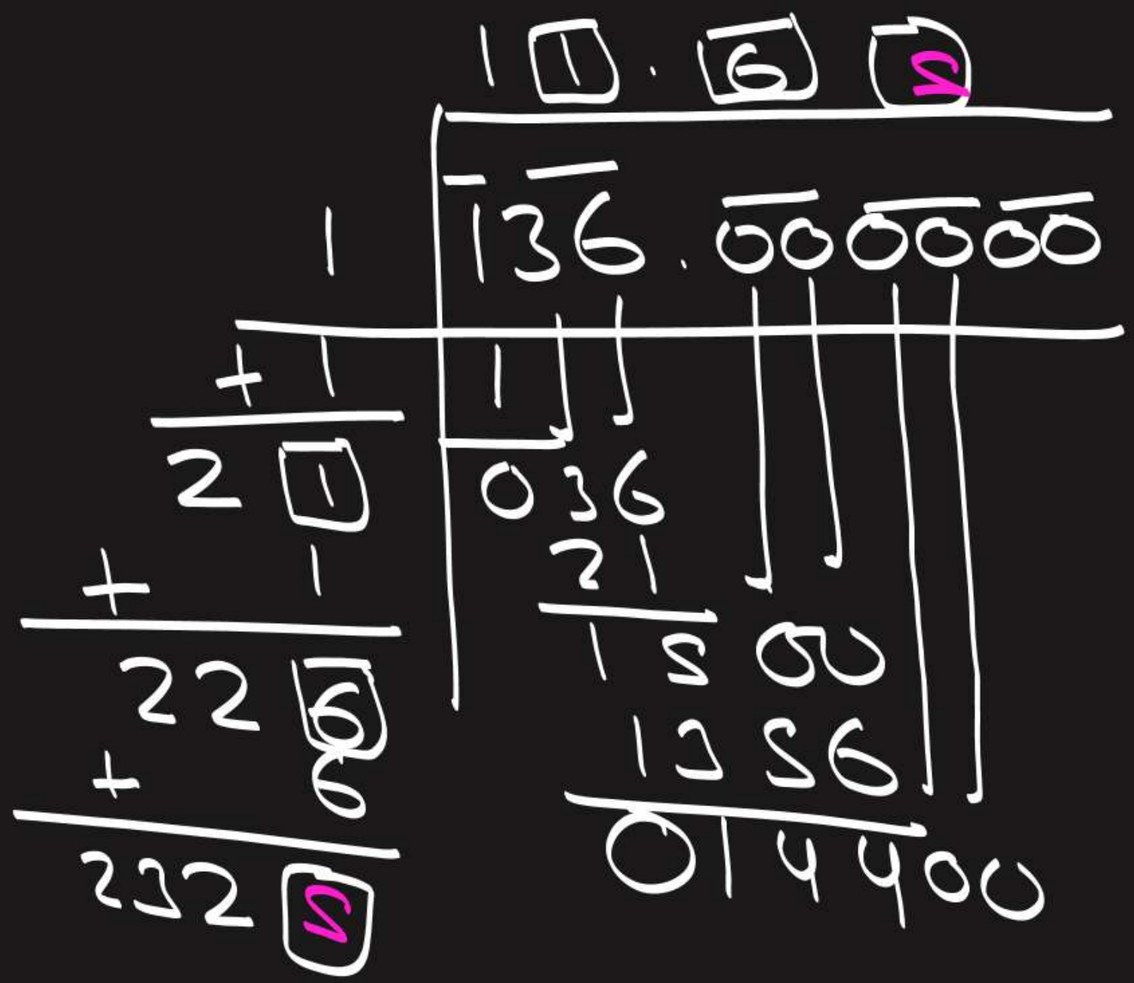
$$= 100 + 36$$

$$l^2 = 136$$

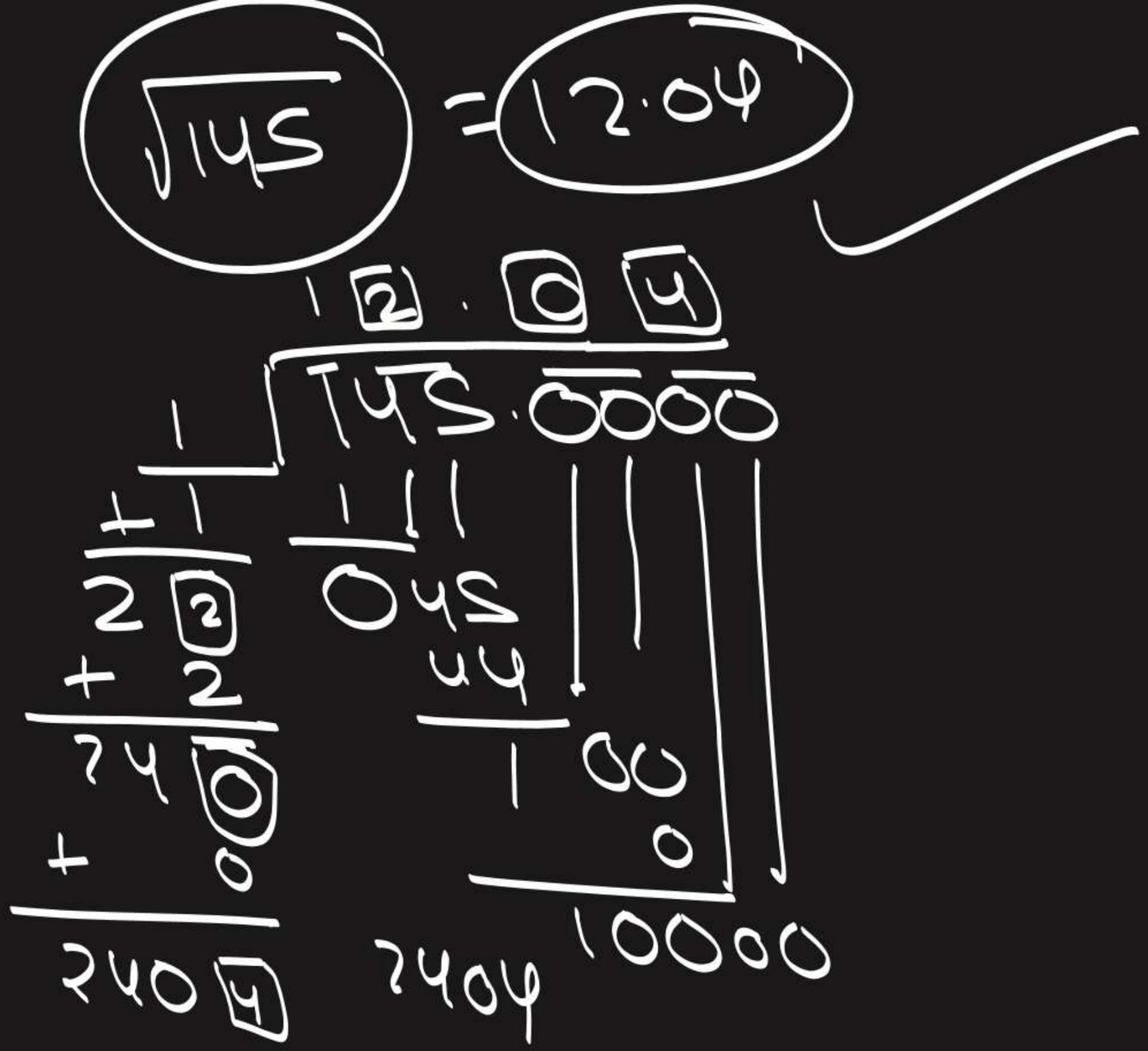
$$l = \pm\sqrt{136}$$

$l = \sqrt{136}$ → Next class

$l = 11.6$ Ans



$\sqrt{145} = 12.04$




WORK HARD
DREAM BIG
NEVER GIVE UP


Thank You Babuaas
Work Hard
Dream Big
Never Give Up