

CHAPTER 11

Mensuration

Cylinder:

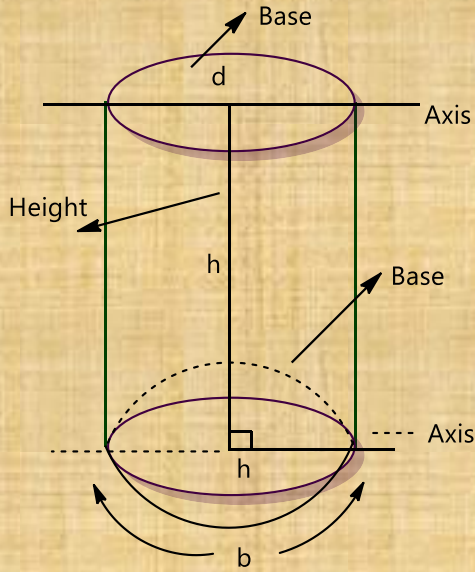
In our day-to-day life, we come across several solids like measuring jars, circular pillars, circular pipes, gas cylinder, a garden roller etc.

When the two opposite ends of a rectangular sheet of paper of length 'h' and width 'b' are joined together a cylinder is formed. The length of the paper becomes the height of the cylinder and its width becomes the circumference of the circular bases.

A cylinder has a curved (Lateral) surface and two plane circular surfaces.



$$b = 2\pi r \text{ (or) } \pi d$$

**Base:**

The two circular plane surfaces of a cylinder are its 'Bases'.

Axis:

The perpendicular line that joins the centres of the bases of cylinder is its 'axis'.

Height:

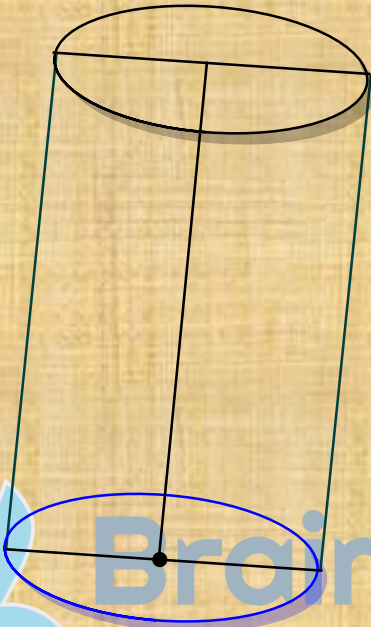
The perpendicular distance between the axis of a cylinder is its Height'.

Right circular cylinder:

If the axis of a cylinder is perpendicular to its bases, then the cylinder is called 'Right circular cylinder'.

Note:

If the axis of a cylinder is not perpendicular to its bases then it is not a right circular cylinder.

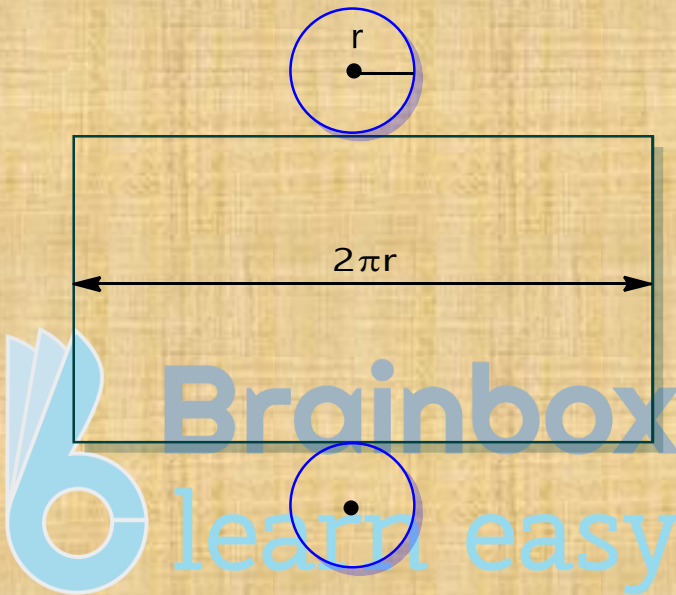
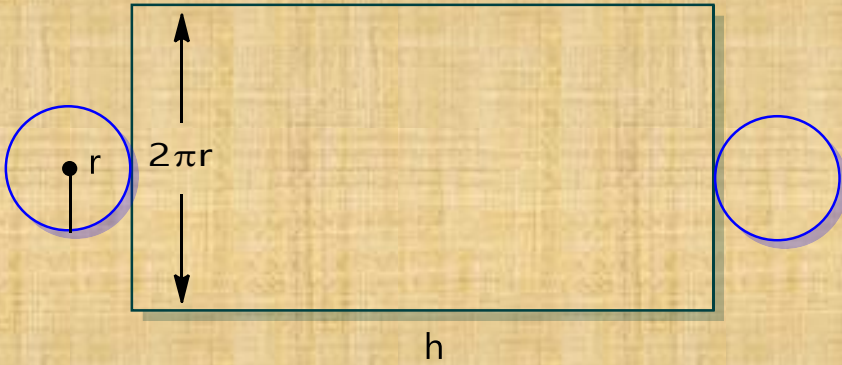
**Curved (Lateral) surface of a right circular cylinder:**

The lateral surface of a cylinder is curved.

∴ Curved (Lateral) surface of a cylinder

$$= (\text{Perimeter of the base}) \times (\text{Height})$$

$$= 2\pi r \times h$$



∴ Curved surface of a cylinder = $2\pi rh$

Total surface area of a right circular cylinder:

Total surface area of the cylinder

$$= (\text{Area of the rectangle}) + (\text{Area of circular ends})$$

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

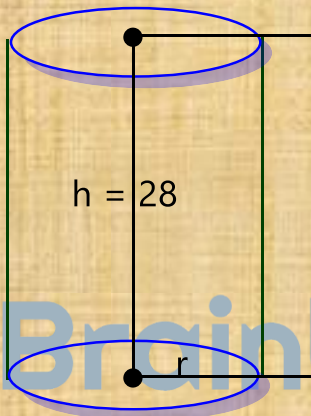
$$= 2\pi r(h+r)$$

\therefore Total surface area of the cylinder = $2\pi r(r+h)$

Example:

Find the radius of the base of a cylinder whose curved surface area is 1232 cm^2 and height is 28 cm.

Sol.



Given that,

Height of the cylinder (h) = 28 cm

Let 'r' be the radius of the base,

\therefore Curved surface area = 1232 cm^2 (Given)

$$2\pi rh = 1232$$

$$2 \times \frac{22}{7} \times r \times 28 = 1232$$

$$r = \frac{\cancel{28} \cancel{616} \times 7}{\cancel{2} \times \cancel{22} \times \cancel{28}} = 7$$

∴ The radius of the base of the cylinder is 7 cm.

