

CHAPTER 13

Surface areas and Volumes

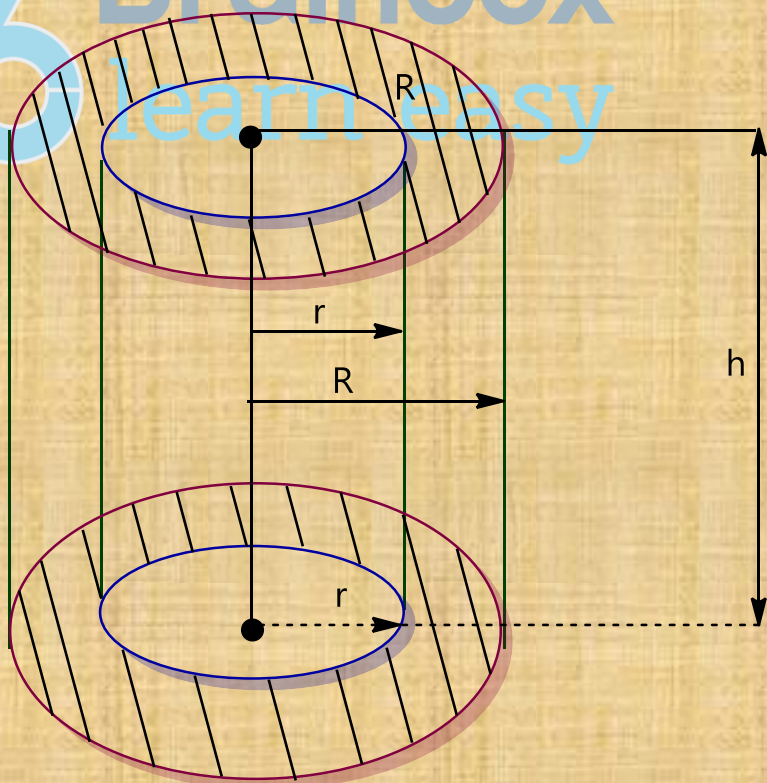
Hollow cylinder:

Hollow cylinder is a solid bounded by two co – axial cylinders of the same height and different radii.

Example:

Rubber pipe and Iron pipe.

Let ' R ' be the external radius of a hollow cylinder, ' r ' its internal radius and ' h ' its height or length; then



- Thickness of cylinder = $R - r$
- Area of cross – section = $\pi R^2 - \pi r^2 = \pi(R^2 - r^2)$
- External curved surface area = $2\pi Rh$
- Internal curved surface area = $2\pi rh$
- Volume of hollow cylinder

$$= (\text{Area of cross – section}) \times (\text{Height})$$

(OR)

$$= (\text{External volume}) - (\text{Internal volume})$$

$$= (\pi R^2 h) - (\pi r^2 h)$$

$$\text{Volume of hollow cylinder} = \pi(R^2 - r^2)h$$

- Total surface area
- $$= (\text{External curved surface area}) + (\text{Internal surface area}) + 2(\text{Area of cross - section})$$
- $$= 2\pi Rh + 2\pi rh + 2\pi(R^2 - r^2)$$
- $$= 2\pi(Rh + rh + (R^2 - r^2))$$