TOPIC 13

Volume and Surface Area of Prisms and Cylinders

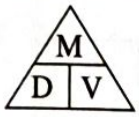
REVISION notes

Conversion of units:

- $1\ m^3 = (100\ cm)^3 = 1\ 000\ 000\ cm^3$
- $1\ l = 1000\ ml = 1000\ cm^3$

Density is defined as a measure of a relative 'heaviness' of an object which have a constant volume. The density of a material is defined as its mass per unit volume,

i.e. $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$



The units of density can be kg/m^3 or g/cm^3.

Cylinder

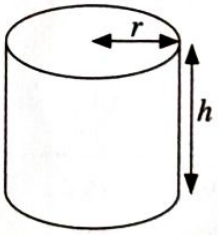
A **cylinder** is a three dimensional geometric figure with straight parallel sides and a circular or oval cross section.

A cylinder can come in different forms.

(a) A open cylinder has a base but without a lid.

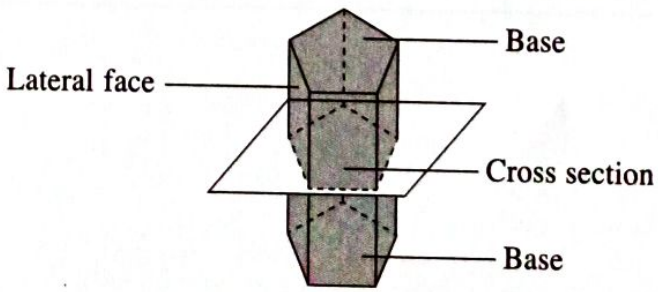
(b) A closed or solid cylinder has both a base and a lid.

(c) A hollow cylinder has a circular hole through the centre of its cross section, i.e. without a lid and without a base.

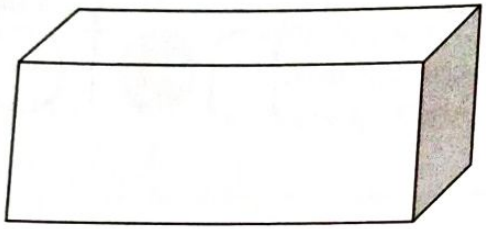


Prism

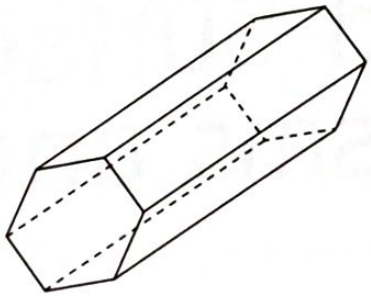
A **prism** is a solid object that has two identical ends, i.e. bases, and flat sides, i.e. lateral faces, with its cross section being the same all along its length. A **cross section** is the shape you get when cutting straight across an object. An example of a prism is shown below.



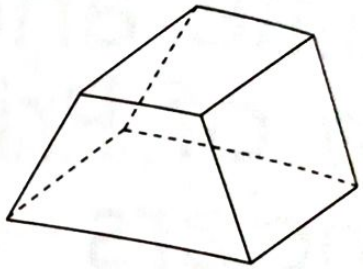
6. A prism is also known as a polyhedron, which is a solid object which has a uniform cross section in the shape of a polygon. The shape at its ends gives the prism its name. A triangular prism, hexagonal prism and cuboid or rectangular prism are examples of prisms with different bases.
Examples of prisms:



Cuboid



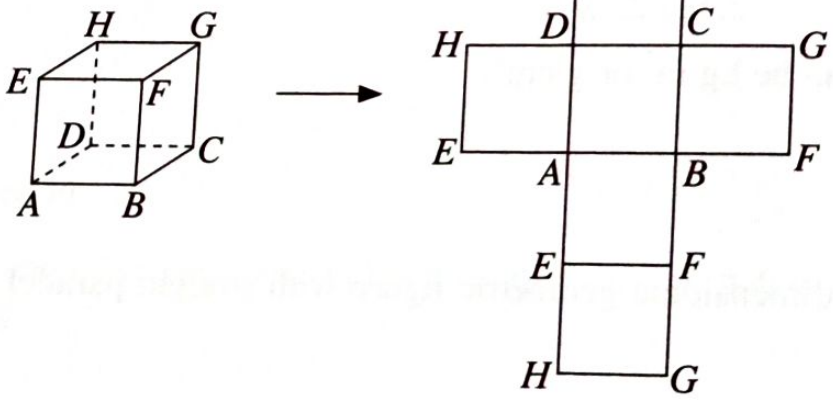
Hexagonal Prism



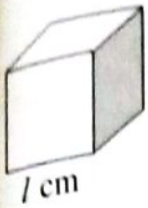
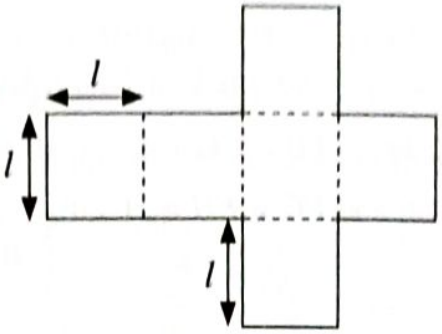
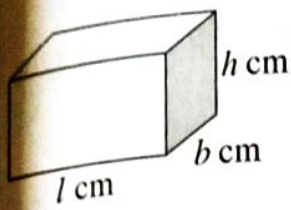
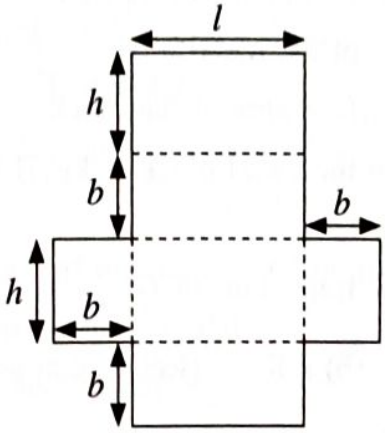
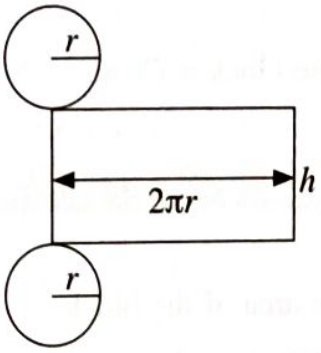
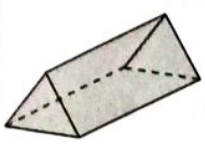
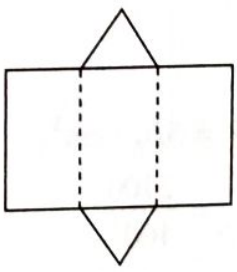
Trapezoidal Prism

7. A **uniform cross section** is the cross section of the solid, parallel to the bases, such that the resulting figure has the same shape and size as that of the base of the figure.

8. The **net** of a figure refers to the pattern that you can cut and fold to make a model of a solid shape.
Example of the net of a cube:



Net, Volume and Surface Area of Cubes, Cuboids, Cylinders and Prisms

Diagram	Figure	Net	Formulae	
			Volume (cm^3)	Surface Area (cm^2)
	Cube		l^3	$6l^2$
	Cuboid		$l \times b \times h$	$2(lb + lh + bh)$
	Closed Cylinder		$\pi r^2 h$	$2\pi r^2 + 2\pi rh$
	Triangular Prism		base area × height Or area of cross section × distance between bases	total area of the lateral faces + 2 × base area