

1. CUBOIDS AND CUBES

Cuboid : A cuboid is a solid figure, held by six rectangular plane regions

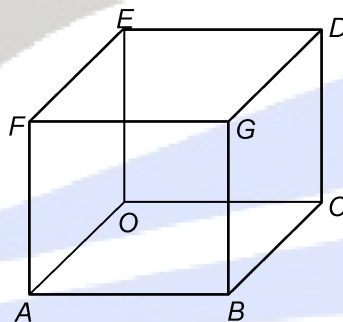
Here, In cuboid we have six faces namely

$$AFGB, BGDC, GFED, OCDE, OEFA, OABC.$$

We also have 12 edges, where two sides meets namely

$$OA, AB, BC, OC, FG, EF, ED, OG, AF, OE, BG, CD.$$

Cube: A cuboid in which we have all length, breadth, height of equal lengths, is called a cube.



It also has six faces and twelve edges.

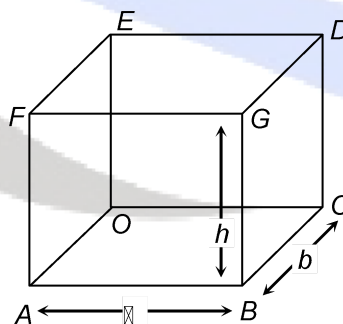
2. SURFACE AREA OF A CUBOID AND A CUBE

2.1 TOTAL SURFACE AREA OF CUBOID

$$= Ar(ABCO) + Ar(EFGD) + Ar(AOEF) + Ar(BCDG) + Ar(ABGF) + Ar(OCDE)$$

$$= \ell b + \ell b + bh + bh + \ell h + \ell h$$

$$= 2(\ell b + bh + \ell h)$$



2.2 LATERAL SURFACE AREA OF CUBOID

$$= 2(bh + \ell h)$$

Where ℓ = length of cuboid

b = breadth of cuboid

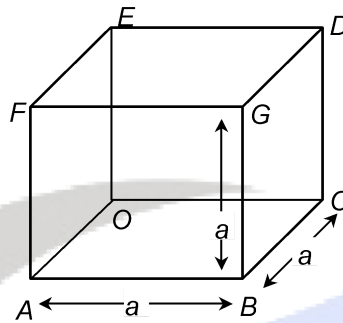
h = height of cuboid

2.3 TOTAL SURFACE AREA OF CUBE

Since cube is a cuboid in which length (l) = breadth (b) = height (h) side of cube (a)

i.e. $l = b = h = a$

\Rightarrow Total surface area of cube



$$= 2(a \times a + a \times a + a \times a)$$

$$= 2(a^2 + a^2 + a^2)$$

Area $= 2(3a^2) = 6a^2$

2.4 LATERAL SURFACE AREA OF CUBE

Area $= 2(a \times a + a \times a)$

$$= 2(a^2 + a^2) = 2 \times 2a^2$$

$$= 4a^2$$

So, lateral surface area of cube = $4a^2$

Where a = length of a side.

2.5 LENGTH OF DIAGONAL OF A CUBOID

Length of diagonal $= OG = AD = BE = CF$

$$= \sqrt{l^2 + b^2 + h^2}$$

l = length; b = breadth; h = height

2.6 LENGTH OF DIAGONAL OF A CUBE

Length of diagonal $= OG = AD = BE = CF$

$$= \sqrt{a^2 + a^2 + a^2}$$

$$= \sqrt{3a^2} = \sqrt{3}a \text{ unit}$$

Where a = length of a side.

3. VOLUME OF A CUBE AND A CUBOID

$$\text{Volume of cuboid} = (\text{length}) \times (\text{breadth}) \times (\text{height})$$

$$= l \times b \times h$$

$$\text{So, } V = l \times b \times h \text{ cubic unit} \quad \dots(i)$$

$$\text{Volume of cube} = a \times a \times a \text{ cubic unit}$$

$$\text{So, } V = a^3 \text{ cubic unit}$$

Where a = side of cube

From (i), it is clear that

$$\text{length} = \frac{\text{volume}}{\text{breadth} \times \text{height}}$$

$$\text{breadth} = \frac{\text{volume}}{\text{length} \times \text{height}}$$

$$\text{height} = \frac{\text{volume}}{\text{length} \times \text{breadth}}$$

4. SURFACE AREA OF A RIGHT CIRCULAR CYLINDER

4.1 CURVED SURFACE AREA OF A CYLINDER

$$= 2\pi rh$$

Where r = radius of base

h = height of cylinder.

4.2 TOTAL SURFACE AREA OF A CYLINDER

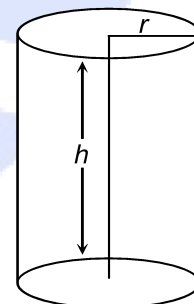
$$= 2\pi rh + 2\pi r^2$$

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

r = radius of base

h = height of cylinder

$$\pi = \frac{22}{7} \text{ or } 3.14 \text{ approx.}$$



5. VOLUME OF CYLINDER

5.1 VOLUME OF CYLINDER

$$V = \pi r^2 h$$

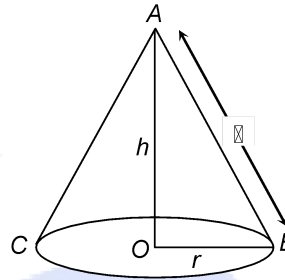
Where r = radius of base
 h = height of cylinder

6. SURFACE AREA OF A RIGHT CIRCULAR CONE

6.1 CURVED SURFACE AREA OF A CONE

$$C = \pi r l$$

C = curved surface area
 r = radius of base of cone
 l = slant height
 $l = \sqrt{h^2 + r^2}$



6.2 TOTAL SURFACE AREA OF A CONE

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

$$= \pi r (r + l)$$

Here, T = total surface area
 r = radius of base of cone
 l = slant height of cone

7. VOLUME OF RIGHT CIRCULAR CONE

Volume of right circular cone

$$V = \frac{1}{3} \pi r^2 h$$

Where V = volume of cone
 r = radius of base of cone
 h = height of cone

8. SPHERE AND HEMI-SPHERE

Sphere : Sphere is a three dimensional figure, which is made up of all points in the space, which lie at a constant distance called the radius, from a fixed point called the centre of sphere.

Hemi-sphere : If we exactly divide the sphere in two parts, then each part is known as hemi-sphere.

9. SURFACE AREA OF SPHERE AND HEMI-SPHERE

9.1 SURFACE AREA OF SPHERE

$$= 4\pi r^2$$

Where r = radius of sphere.

9.2 CURVED SURFACE AREA OF HEMI-SPHERE

$$= 2\pi r^2$$

Where r = radius of hemi-sphere.

9.3 TOTAL SURFACE AREA OF HEMI-SPHERE

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

$$= 3\pi r^2$$

Where r = radius of hemi-sphere.

10. VOLUME OF SPHERE AND HEMI-SPHERE

10.1 VOLUME OF SPHERE

$$= \frac{4}{3} \pi r^3$$

Where r = radius of sphere

10.2 VOLUME OF A HEMI-SPHERE

$$= \frac{2}{3} \pi r^3$$

Where r = radius of hemi-sphere