Ch.13 – Surface Area and Volume of Cuboid

Formula

Sr. No	Type	Explanation
1	Surface area of the cuboid	• The total surface area of the cuboid (TSA cuboid) = $2(l \times b) + 2(b \times h) + 2(l \times h) = 2(lb + bh + lh)$ • Lateral surface area (LSA) is the area of all the sides apart from the top and bottom faces. • LSA (cuboid) = $2(b \times h) + 2(l \times h) = 2h(l + b)$ • Length of diagonal of a cuboid $= \sqrt{(l^2 + b^2 + h^2)}$
2	Volume of a Cuboid	• The volume of a cuboid is the space occupied within its six rectangular faces. • Volume of a cuboid = (base area) $\times$ height = lbh
3	Surface Area of Cube	• The total surface area of the cube (TSA) = Sum of the areas of all its six faces. • In case of all faces has an equal area, TSA of Cube = $6 \times$ area of Square = $6l^2$ square units. • the Lateral surface area of cube = $2(l \times l + l \times l) = 4l^2$ • Diagonal of a cube $= \sqrt{3}l$
4	Volume of a Cube	• Volume of a cube = base area $\times$ height • Since all dimensions of a cube are identical, volume $= l^3$ • Where l is the length of the edge of the cube.
5	Surface Area of Cylinder	• CSA of a cylinder of base radius r and height h = $2\pi \times r \times h$ • TSA of a cylinder of base radius r and height h = $2\pi \times r \times h$ + area of two circular bases • = $2\pi r (h + r)$
6	Volume of a Cylinder	• Base area $\times$ height = $\pi r^2 h$
7	Surface area of cone	• CSA of right circular cone = $\pi r l$ • TSA = CSA + area of base = $\pi r l + \pi r^2 = \pi r (l + r)$
8	Volume of a Right Circular Cone	• The volume of a Right circular cone = $(1/3) \pi r^2 h$
9	Surface area of Sphere	• Curved Surface Area (CSA) = Total Surface Area (TSA) = $4\pi r^2$
10	Volume of Sphere	• $(4/3) \pi r^3$
11	Surface Area of Hemisphere	• CSA of Hemisphere = $2\pi r^2$, TSA of Hemisphere = $3\pi r^2$
12	Volume of Hemisphere	• $(2/3) \pi r^3$
13	Surface Area of Frustum	• CSA of Frustum = $\pi(r_1 + r_2) l$, TSA of Frustum = $\pi (r_1 + r_2) l + \pi (r_1^2 + r_2^2)$
14	Volume of Frustum	• $(1/3) \pi h (r_1^2 + r_2^2 + r_1 r_2)$

Q A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter l of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid

Q A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

Q A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

Q The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.