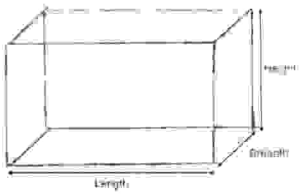
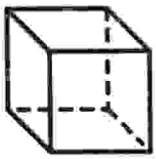
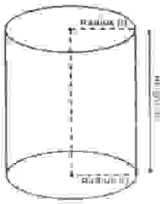
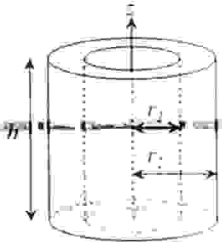
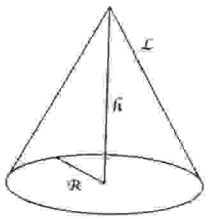
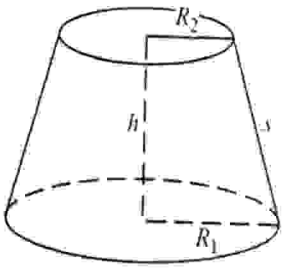
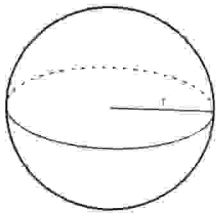
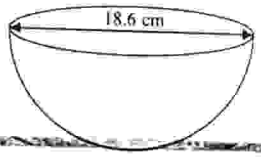
BALABHADRA SKILL DEVELOPMENT ACADEMY
MATHS FORMULA - 18
MENSURATION

VOLUME AND SURFACE AREA

Sl	Situation	Formula	Diagram
1	Volume of a 3-D figure is the amount of space occupied by it. It is measured in cubic units.	Length×Breadth × Height	--
2	Cuboid: If length, breadth and height of a cuboid are l, b and h respectively, then Diagonal	$\sqrt{l^2 + b^2 + h^2}$	
	Volume	lbh	
	Total Surface area	$2(lb + bh + hl)$	
3	Cube: If a be the side of a cube, then Diagonal	$a\sqrt{3}$	
	Volume	a^3	
	Total Surface area	$6a^2$	
4	Cylinder: If r be the radius of base of cylinder and h be its height, then Volume	$\pi r^2 h$	
	Curved surface area	$2\pi rh$	
	Total surface area	$2\pi r(h + r)$	
5	Hollow Cylinder: Let R be the outer radius of the hollow cylinder and r be its inner radius Volume	$\pi h(R^2 - r^2)$	
	Curved surface area	$2\pi h(R + r)$	
	Total Surface area	$2\pi h(R + r) + 2\pi(R^2 - r^2)$	

6	Cone: If 'h' be the height of the cone and 'r' be the radius of base of cone, then Slant height	$l = \sqrt{h^2 + r^2}$	
	Volume	$\frac{1}{3}\pi r^2 h$	
	Curved surface area	$\pi r l$	
	Total surface area	$\pi r(l + r)$	
7	Frustum: If the radii of base and top circular region be r_1 and r_2, respectively and its height is h, then Slant height	$l = \sqrt{h^2 + (r_1 - r_2)^2}$	
	Volume	$\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$	
	Curved surface area	$\pi l(r_1 + r_2)$	
	Total surface area	$\pi l(r_1 + r_2) + \pi r_1^2 + \pi r_2^2$	
8	Sphere: If the radius of sphere is r, then Volume	$\frac{4}{3}\pi r^3$	
	Total Surface area	$4\pi r^2$	
9	Hemisphere: Volume of hemisphere	$\frac{2}{3}\pi r^3$	
	Curved surface area of hemisphere	$2\pi r^2$	
	Total surface area of hemisphere	$3\pi r^2$	
10	Hollow Sphere: If external and internal radii of a hollow sphere are r1 and r2, then Volume	$\frac{4}{3}\pi(r_1^3 - r_2^3)$	--
	Internal Surface area	$4\pi r_1^2$	
	External Surface area	$4\pi r_2^2$	

11	Prism: Volume	Area of base × Height	--
	Lateral Surface area	Perimeter of base × Height	
	Total surface area	Lateral Surafce area + 2 × Area of base	
12	Pyramid: Volume	$\frac{1}{3}$ × Area of base × Height	--
	Total Surafce area	Area of base + Lateral surafce area	
13	Area of four walls of a room	2(Length + Breadth) × Height	--
14	Three cubes of metal whose sides are a,b and c respectively are melted to form a new big cube. If there is no loss of weight in this process, then side of new cube will be	$\sqrt[3]{a^3 + b^3 + c^3}$	--
15	If any two sides of a figure are increased (decreased) by x% and y% respectively, then per cent increase (decrease) in volume of figure will be	$\left(\pm x \pm y + \frac{(\pm x)(\pm y)}{100}\right)\%$	--
16	If length, breadth and height of a cuboid are increased by x%, y% and z% respectively, then volume of cuboid is increased by	$\left(x + y + z + \frac{xy + yz + zx}{100} + \frac{xyz}{(100)^2}\right)\%$	--

17	If each side of a cube is increased (decreased) by x%, then per cent increase (decrease) in volume of cube will be	$\left[\left(1+\frac{x}{100}\right)^3-1\right]\times 100\%$	--
18	If each side of a cube is increased (decreased) by x%, then increase (decrease) in total surface area of a cube will be	$\left(\pm 2x \pm \frac{x^2}{100}\right)\%$	--