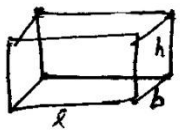
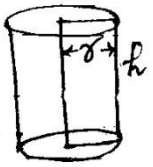
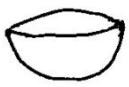
Chapter - 13

(Surface areas and Volumes)

Key Concepts

SN.	Name	Figure	Lateral/curved surface area	Total surface area TSA	Volume (V)	Symbols use for
1	Cuboid		$2(l+b)\times h$	$2(lb+bh+hl)$	lbh	$l = length$ b = breadth h = height
2.	Cube		$4s^2$	$6s^2$	s^3	s = side
3.	Right circular cylinder		$2\pi rh$	$2\pi r(h+r)$	$\pi r^2 h$	h = height r = radius of base
4.	Right circular cone	 $l^2 = r^2 + h^2$	πrl	$\pi r(l+r)$	$\frac{1}{3}\pi r^2 h$	r = radius of base h = height l = slant height
5.	Sphere		$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^3$	r = OA = radius
6.	Hemi sphere Solid		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$	r = OA = radius
7.	Hemi sphere hollow		$2\pi r^2$	$2\pi r^2$	$\frac{2}{3}\pi r^3$	r = OA = radius

Section - A

Q.1 If surface areas of two spheres are in the ratio of 4: 9 then the ratio of their volumes is

(a) $\frac{16}{27}$ (b) $\frac{4}{27}$ (c) $\frac{8}{27}$ (d) $\frac{9}{27}$

Q.2 The surface area of a cube whose edge is 11cm is

(a) 725cm^2 (b) 726cm^2 (c) 727cm^2 (d) 728cm^2

Q.3 A match box measures 4cm X 2.5cm X 1.5cm. What will be the volume of a packet containing 12 such boxes?

(a) 15cm^3 (b) 180cm^3 (c) 90cm^3 (d) 175cm^3

Q.4 The curved surface area of a right circular cylinder of height 14cm is 88cm^2. Find the diameter of the base of the cylinder.

(a) 1cm (b) 2cm (c) 3cm (d) 4cm

Q.5 The total surface area of a cone of radius $\frac{r}{2}$ and length $2l$ is

(a) $2\pi r(l + r)$ (b) $\pi r(l + r)$

(c) $\pi r\left(l + \frac{r}{4}\right)$ (d) $\pi r\left(l + \frac{r}{2}\right)$

Q.6 The surface area of sphere of radius 10.5cm is

(a) 1386cm^2 (b) 616cm^2

(c) 1390cm^2 (d) 10cm^2

Section - B

Q.7 Find the volume of a sphere whose surface area is 154cm^2.

Q.8 A solid cylinder has a total surface area of 231cm^2. Its curved surface area is $\frac{2}{3}$ of the total surface area. Find the volume of the cylinder.

Q.9 The diameter of a garden roller is 1.4m and it is 2m long. How much area will it cover in 5 revolutions? ($\pi = 22/7$)

Q.10 Three metal cubes whose edge measure 3cm, 4cm and 5cm respectively are melted to form a single cube, find its edge.

Q.11 The dimensions of a cubiod are in the ratio of 1 : 2 : 3 and its total surface area is 88m^2. Find the dimensions.

Section - C

Q.12 A cuboidal oil tin is 30cm X 40cm X 50cm. Find the cost of the tin required for making 20 such tins if the cost of tin sheet is Rs. 20/m^2.

Q.13 Find the lateral curved surface area of a cylindrical petrol storage tank that is 4.2m in diameter and 4.5m high. How much steel was actually used, if $\frac{1}{12}$ of steel actually used was wasted in making the closed tank.

Q.14 The radius and height of a cone are in the ratio 4 : 3. The area of the base is 154cm^2. Find the area of the curved surface.

Q.15 A sphere, cylinder and cone are of the same radius and same height. Find the ratio of their curved surfaces.

Q.16 A hemispherical bowl of internal diameter 36cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3cm and height 6cm. How many bottles are required to empty the bowl?

Q.17 A hemisphere of lead of radius 8cm is cast into a right circular cone of base radius 6cm. Determine the height of the cone.

Section - D

Q.18 A wooden toy is in the form of a cone surmounted on a hemisphere. The diameter of the base of the cone is 6cm and its height is 4cm. Find the cost of painting the toy at the rate of Rs. 5 per 1000cm^2.

Q.19 Find the volume of the largest right circular cone that can be fitted in a cube whose edge is 14cm.

Q.20 A cone of height 24cm and slant height 25cm has a curved surface area 550cm^2. Find its volume use $\pi = \frac{22}{7}$

Q.21 The radius and height of a cone are 6cm and 8cm respectively. Find the curved surface area of the cone.

Q.22 A well with 10m inside diameter is dug 14m deep. Earth taken out of it is spread all around to a width of 5m to form an embankment. Find the height of embankment.

Q.23 A metallic sheet is of the rectangular shape with dimensions 48cm X 36cm. From each one of its corners, a square of 8cm is cutoff. An open box is made of the remaining sheet. Find the volume of the box.

self evaluation

Q.24 Water in a canal, 30dm wide and 12dm deep is flowing with a velocity of 20km per hour. How much area will it irrigate in 30min. if 9cm of standing water is desired? (10dm = 1 meter)

Q.25 Three cubes of each side 4cm are joined end to end. Find the surface area of resulting cuboid.

Q.26 A hollow cylindrical pipe is 210cm long. Its outer and inner diameters are 10cm and 6cm respectively. Find the volume of the copper used in making the pipe.

Q.27 A semi circular sheet of metal of diameter 28cm is bent into an open conical cup. Find the depth and capacity of cup.

Q.28 If the radius of a sphere is doubled, what is the ratio of the volume of the first sphere to that of second sphere?

Answer

Q.1 c Q.2 b Q.3 b Q.4 b

Q.5 c Q.6 a

Q.7 179.66cm^2

Q.8 269.5cm^2 Q.9 44m^2

Q.10 6cm Q.11 2, 4, 6 cm

Q.12 Rs. 376 Q.13 59.4m^2, 95.04m^2

Q.14 192.5cm^2

Q.15 4 : 4 : $\sqrt{5}$ Q.16 72

Q.17 28.44 Q.18 Rs. 0.51

Q.19 718.66cm^3 Q.20 1232 cm^2

Q.21 60πcm^2 Q.22 4.66m

Q.23 5120cm^3 Q.24 4,00,000m^2

Q.25 224 cm^2 Q.26 10560cm^3

Q.27 12.12cm, 622.26cm^3

Q.28 1:8