# RD Sharma Class 10 Solutions Chapter 16 Surface Areas and Volumes VSAQS

**Question 1.**
**The radii of the bases of a cylinder and a cone are in the ratio 3 : 4 and their heights are in the ratio 2 : 3. What is the ratio of their volumes ?**
**Solution:**
Radii of the bases of a cylinder and a cone = 3:4
and ratio in their heights = 2:3
Let $r_1$, $r_2$ be the radii and $h_1$ and $h_2$ be their heights
heights of the cylinder and cone respectively,

then $\frac{r_1}{r_2} = \frac{3}{4}$

and $\frac{h_1}{h_2} = \frac{2}{3}$

Now $\frac{\text{Volume of cylinder}}{\text{Volume of cone}}$

$$= \frac{\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$$

$$= \frac{3r_1^2 h_1}{r_2^2 h_2} = 3\left(\frac{r_1}{r_2}\right)^2 \times \left(\frac{h_1}{h_2}\right)$$

$$= 3 \times \left(\frac{3}{4}\right)^2 \times \frac{2}{3}$$

$$= 3 \times \frac{9}{16} \times \frac{2}{3} = \frac{9}{8}$$

$\therefore$ Ratio in their volumes = 9 : 8

**Question 2.**
**If the heights of two right circular cones are in the ratio 1 : 2 and the perimeters of their bases are in the ratio 3 : 4. What is the ratio of their volumes ?**
**Solution:**

Ratio in the heights of two cones =1:2 and ratio in the perimeter of their bases = 3:4
Let $r_1$, $r_2$ be the radii of two cones and ht and h2 be their heights

$$\therefore \frac{h_1}{h_2} = \frac{1}{2}$$

$$\text{and } \frac{2\pi r_1}{2\pi r_2} = \frac{3}{4}$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{3}{4}$$

$$\text{Now } \frac{\text{Volume of first cone}}{\text{Volume of second cone}} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$$

$$= \frac{r_1^2 h_1}{r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$$

$$= \left(\frac{3}{4}\right)^2 \times \frac{1}{2} = \frac{9}{16} \times \frac{1}{2} = \frac{9}{32}$$

$\therefore$ Ratio in their volumes = 9 : 32

**Question 3.**
**If a cone and sphere have equal radii and equal volumes what is the ratio of the diameter of the sphere to the height of the cone ?**
**Solution:**
Let r be the radius of a cone, then
radius of sphere = r
Let h be the height of cone
Now volume of cone = volume of sphere

$$\Rightarrow \frac{1}{3}\pi r^2 h = \frac{4}{3}\pi r^3$$

$$\Rightarrow h = 4r = 2\,(2r) \qquad \left(\text{Dividing by } \frac{1}{3}\pi r^2\right)$$

$$\Rightarrow \frac{2r}{h} = \frac{1}{2} \Rightarrow \frac{\text{diameter of sphere}}{\text{height of cone}} = \frac{1}{2}$$

$\therefore$ Ratio = 1 : 2

**Question 4.**
**A cone, a hemisphere and a cylinder stand on equal bases and have the same height. What is the ratio of their volumes?**
**Solution:**
Let r and h be the radius and heights of a cone, a hemisphere and a cylinder
∴ Volume of cone = (13) $\pi r^2 h$
Volume of hemisphere = (23) $\pi r^3$

$$\text{Volume of cylinder} = \pi r^2 h$$

$$\therefore \frac{1}{3}\pi r^2 h : \frac{2}{3}\pi r^3 : \pi r^2 h$$

$$= \frac{1}{3}h : \frac{2}{3}r : h$$

$$= h : 2r : 3h = h : 2h : 3h$$

$$(\because r = h \text{ in hemisphere})$$

$$= 1 : 2 : 3$$

**Question 5.**
**The radii of two cylinders are in the ratio 3 : 5 and their heights are in the ratio 2 : 3. What is the ratio of their curved surface areas ?**
**Solution:**
Radii of two cylinders are in the ratio = 3:5
and ratio in their heights = 2:3
Let $r_1$, $r_2$ be the radii and $h_1$, $h_2$ be the heights of the two cylinders respectively, then

$$\frac{r_1}{r_2} = \frac{3}{5} \text{ and } \frac{h_1}{h_2} = \frac{2}{3}$$

$$\text{Now } \frac{\text{Curved surface of first cylinder}}{\text{Curved surface of second cylinder}}$$

$$= \frac{2\pi r_1 h_1}{2\pi r_2 h_2}$$

$$= \frac{r_1 h_1}{r_2 h_2} = \frac{r_1}{r_2} \times \frac{h_1}{h_2}$$

$$= \frac{3}{5} \times \frac{2}{3} = \frac{2}{5}$$

$$\therefore \text{ Their ratio} = 2 : 5$$

**Question 6.**
**Two cubes have their volumes in the ratio 1 : 27. What is the ratio of their surface areas ?**

**Solution:**
Ratio in the volumes of two cubes = 1 : 27
Let $a_1$ and $a_2$ be the sides of the two cubes respectively then volume of the first area = $a_1^3$
and volume of second cube = $a_2^3$

$$\therefore \frac{a_1^3}{a_2^3} = \frac{1}{27} \Rightarrow \left(\frac{a_1}{a_2}\right)^3 = \left(\frac{1}{3}\right)^3$$

$$\Rightarrow \frac{a_1}{a_2} = \frac{1}{3}$$

$$\text{Now } \frac{\text{Surface area of the first cube}}{\text{Surface area of the second cube}}$$

$$= \frac{6a_1^2}{6a_2^2}$$

$$= \frac{a_1^2}{a_2^2} = \left(\frac{a_1}{a_2}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$$

$\therefore$ The ratio in them = 1 : 9

**Question 7.**
**Two right circular cylinders of equal volumes have their heights in the ratio 1 : 2. What is the ratio of their radii ?**
**Solution:**
Ratio the heights of two right circular cylinders = 1:2
Let $r_1, r_2$ be their radii and $h_1$, $h_2$ be their

heights respectively then $\frac{h_1}{h_2} = \frac{1}{2}$

$\because$ Their volumes are equal

$$\therefore \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{1}{1} \Rightarrow \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2} = 1$$

$$\left(\frac{r_1}{r_2}\right)^2 \times \frac{1}{2} = 1 \Rightarrow \left(\frac{r_1}{r_2}\right)^2 = \frac{2}{1} \Rightarrow \frac{r_1}{r_2} = \frac{\sqrt{2}}{1}$$

$\therefore$ Ratio of their radii are = $\sqrt{2}$ : 1

**Question 8.**
**If the volumes of two cones are in the ratio 1 : 4, and their diameters are in the ratio 4 : 5, then write the ratio of their weights.**
**Solution:**
Volumes of two cones are in the ratio =1:4 and their diameter are in the ratio = 4:5
Let $r_1$ and $r_2$ be the radii and $h_1$, $h_2$ be their

heights of two cones respectively, then

$$\frac{2r_1}{2r_2} = \frac{4}{5} \Rightarrow \frac{r_1}{r_2} = \frac{4}{5}$$

and $$\frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{1}{4} \Rightarrow \left(\frac{r_1}{r_2}\right)^2 \left(\frac{h_1}{h_2}\right) = \frac{1}{4}$$

$$\Rightarrow \left(\frac{4}{5}\right)^2 \times \frac{h_1}{h_2} = \frac{1}{4} \Rightarrow \frac{16}{25} \times \frac{h_1}{h_2} = \frac{1}{4}$$

$$\Rightarrow \frac{h_1}{h_2} = \frac{1}{4} \times \frac{25}{16} = \frac{25}{64}$$

$\therefore$ Ratio in their heights = 25 : 64

**Question 9.**
**A sphere and a cube have equal surface areas. What is the ratio of the volume of the sphere to that of the cube ?**
**Solution:**
Surface areas of a sphere and a cube are equal

Let r be the radius of sphere and a be the edge of cube,

$$\text{Then } 4\pi r^2 = 6a^2 \Rightarrow \frac{r^2}{a^2} = \frac{6}{4\pi} = \frac{3}{2\pi}$$

$$\Rightarrow \frac{r}{a} = \sqrt{\frac{3}{2\pi}}$$

$$\text{Now } \frac{\text{Volume of sphere}}{\text{Volume of cube}} = \frac{\frac{4}{3}\pi r^3}{a^3} = \frac{4\pi r^3}{3a^3}$$

$$= \frac{4\pi}{3}\left(\frac{r}{a}\right)^3 = \frac{4\pi}{3} \times \left(\sqrt{\frac{3}{2\pi}}\right)^3$$

$$= \frac{4\pi}{3} \times \sqrt{\left(\frac{27}{8\pi^3}\right)} = \frac{4\pi}{3} \times \frac{3\sqrt{3}}{2\pi\sqrt{2\pi}}$$

$$\frac{2\sqrt{3}}{\sqrt{2}\sqrt{\pi}} = \frac{\sqrt{2}\sqrt{3}}{\sqrt{\pi}} = \sqrt{\frac{6}{\pi}}$$

$$\therefore \text{ Ratio} = \sqrt{\frac{6}{\pi}} : 1 = \frac{\sqrt{6}}{\sqrt{\pi}} : 1$$

$$= \sqrt{6} : \sqrt{\pi}$$

**Question 10.**
**What is the ratio of the volume of a cube to that of a sphere which will fit inside it?**
**Solution:**
A sphere is fit inside the cube
Side of a cube = diameter of sphere

Let a be the side of cube and r be the radius of the sphere, then

$$2r = a \Rightarrow \frac{a}{r} = \frac{2}{1}$$

$$\text{Now } \frac{\text{Volume of cube}}{\text{Volume of sphere}} = \frac{a^3}{\frac{4}{3}\pi r^3}$$

$$= \frac{3a^3}{4\pi r^3} = \frac{3}{4\pi} \times \left(\frac{a}{r}\right)^3$$

$$= \frac{3}{4\pi}\left(\frac{2}{1}\right)^3 = \frac{3 \times 8}{4\pi \times 1} = \frac{6}{\pi}$$

$\therefore$ Their ratio = $6 : \pi$

**Question 11.**

**What is the ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height ?**

**Solution:**

Diameters (or radii), and heights of a cylinder a cone and a sphere are equal,
Let r and h be the radius and height be the cone cylinder, cone and sphere respectively, thus their volumes will be

$$\pi r^2 h : \frac{1}{3}\pi r^2 h : \frac{4}{3}\pi r^3$$

$$\Rightarrow h : \frac{1}{3}h : \frac{4}{3}r$$

$$\Rightarrow 3h : h : 4h \qquad (\because r = h \text{ in sphere})$$

$$\Rightarrow 3 : 1 : 4$$

**Note:** If we take volume of hemisphere instead of sphere, then the ratio will be 3 : 1 : 2



**Question 12.**

**A sphere of maximum volume is cut-out from a solid hemisphere of radius r. What is the ratio of the volume of the hemisphere to that of the cut-out sphere?**

**Solution:**

r is the radius of a hemisphere, then

the diameter of the sphere which is cut out of the hemisphere will be r

$\therefore$ Its radius $= \dfrac{r}{2}$

Now $\dfrac{\text{Volume of the hemisphere}}{\text{Volume of the sphere (cutout)}}$

$$= \frac{\frac{2}{3}\pi r^3}{\frac{4}{3}\pi\left(\frac{r}{2}\right)^3} = \frac{\frac{2}{3}\pi r^3}{\frac{4}{3}\pi\frac{r^3}{8}}$$

$$= \frac{\frac{2}{3}\pi r^3}{\frac{1}{2\times 3}\pi r^3} = \frac{2}{3} \times \frac{6}{1} = \frac{4}{1}$$

$\therefore$ Ratio = 4 : 1

**Question 13.**

**A metallic hemisphere is melted and recast in the shape of a cone with the same base radius R as that of the hemisphere. If H is the height of the cone, then write the value of (HR).**

**Solution:**

R is the radius of a hemisphere 2

$\therefore$ Volume $= \dfrac{2}{3}\pi R^3$

Now radius of cone formed from it = R

and height = H

$\therefore$ Volume $= \dfrac{1}{3}\pi R^2 H$

$$\frac{\frac{1}{3}\pi R^2 H}{\frac{2}{3}\pi R^3} = 1 \quad (\because \text{Their volumes is same})$$

$$\Rightarrow \frac{H}{2R} = 1 \Rightarrow \frac{H}{R} = \frac{2}{1}$$

$$\therefore \frac{H}{R} = 2$$

**Question 14.**

**A right circular cone and a right circular cylinder have equal base and equal height. If the radius of the base and height are in the ratio 5 : 12, write the ratio of the total surface area of the cylinder to that of the cone.**

**Solution:**

Radius and height of a cone and a cylinder be r and h respectively

$\because$ Radius : Height = 5 : 12 $\Rightarrow r : h = 5 : 12$

But $\frac{r}{h} = \frac{5}{12} \Rightarrow r = \frac{5}{12} h$

Now total surface area of cylinder

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

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

and total surface area of cone $= \pi rl + \pi r^2$

$= \pi r (l + r)$

$$\therefore \frac{2\pi r(h+r)}{\pi r(l+r)} = \frac{2(h+r)}{l+r} = \frac{2(h+r)}{\sqrt{h^2+r^2}+r}$$

$$= \frac{2h+2r}{\sqrt{h^2+r^2}+r} + \frac{2h+2\times\frac{5}{12}h}{\sqrt{h^2+\left(\frac{5}{12}h\right)^2}+\frac{5}{12}h}$$

$$= \frac{2h+\frac{5}{6}h}{\sqrt{h^2+\frac{25h^2}{144}}+\frac{5}{12}h} = \frac{\frac{17}{6}h}{\sqrt{\frac{169h^2}{144}}+\frac{5}{12}h}$$

$$= \frac{\frac{17}{6}h}{\frac{13}{12}h+\frac{5}{12}h} = \frac{\frac{17}{6}h}{\frac{18}{12}h} = \frac{17}{6} \times \frac{12h}{18h}$$

$$= \frac{34}{18} = \frac{17}{9}$$

$\therefore$ Their ratio = 17 : 9



**Question 15.**

**A cylinder, a cone and a hemisphere are of equal base and have the same height.**

**What is the ratio of their volumes ?**

**Solution:**

Let r and h be the radii and heights of the cylinder cone and hemisphere respectively, then

Volume of cylinder = $\pi r^2 h$

Volume of cone = (13) $\pi r^2 h$

Volume of hemisphere = (23) $\pi r^3$

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

$$\Rightarrow h : \frac{1}{3}h : \frac{2}{3}r \qquad \text{(Dividing by } \pi r^2\text{)}$$

$$\Rightarrow h : \frac{1}{3}h : \frac{2}{3}h \qquad (\because r = h \text{ in hemisphere})$$

$$\Rightarrow 1 : \frac{1}{3} : \frac{2}{3} \Rightarrow 3 : 1 : 2$$

**Question 16.**

**The radii of two cones are in the ratio 2 : 1 and their volumes are equal. What is the ratio of their heights ?**

**Solution:**

Radii of two cones are in the ratio = 2:1

Let $r_1$, $r_2$ be the radii of two cones and $h_1$, $h_2$ be their heights respectively,

Then $\frac{r_1}{r_2} = \frac{2}{1}$

Now $\frac{\text{Volume of first cone}}{\text{Volume of the second cone}}$

$$= \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$$

$$= \frac{r_1^2 h_1}{r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \left(\frac{h_1}{h_2}\right)$$

$$= \left(\frac{2}{1}\right)^2 \times \frac{h_1}{h_2} = \frac{4h_1}{h_2}$$

$\because$ Their volumes are equal

$\therefore \frac{4h_1}{h_2} = 1$

$\Rightarrow \frac{h_1}{h_2} = \frac{1}{4}$

$\therefore$ Their ratio is = 1 : 4

**Question 17.**

**Two cones have their heights in the ratio 1 : 3 and radii 3:1. What is the ratio of their volumes ?**

**Solution:**

Ratio in heights of two cones = 1:3

and ratio in their ratio = 3:1

Let $r_1$, $r_2$ be their radii and $h_1$, $h_2$ be their heights, then

$$\frac{r_1}{h_2} = \frac{3}{1} \text{ and } \frac{h_1}{h_2} = \frac{1}{3}$$

Now $\frac{\text{Volume of first cone}}{\text{Volume of second cone}}$

$$= \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$$

$$= \left(\frac{3}{1}\right)^2 \times \frac{1}{3} = \frac{9}{1} \times \frac{1}{3} = \frac{3}{1}$$

$\therefore$ Their ratio = 3 : 1

**Question 18.**

**A hemisphere and a cone have equal bases. If their heights are also equal, then what is the ratio of their curved surfaces ?**

**Solution:**

Bases of a hemisphere and a cone are equal
and their heights are also equal
Let r and h be their radii and heights
respectively

$\therefore r = h_1$

$$\text{Now } \frac{\text{Curved surface of hemisphere}}{\text{Curved surface of cone}}$$

$$= \frac{2\pi r^2}{\pi r l} = \frac{2r^2}{rl} = \frac{2r}{l} = \frac{2r}{\sqrt{r^2+h^2}}$$

$$\left(\because l = \sqrt{r^2+h^2}\right)$$

$$= \frac{2r}{\sqrt{r^2+r^2}} \qquad (\because r = h)$$

$$= \frac{2r}{\sqrt{2r^2}} = \frac{2r}{\sqrt{2}.r} = \frac{2}{\sqrt{2}}$$

$$= \frac{\sqrt{2}}{1} \qquad \text{(Dividing by } \sqrt{2}\text{)}$$

$\therefore$ Their ratio $= \sqrt{2} = 1$

**Question 19.**

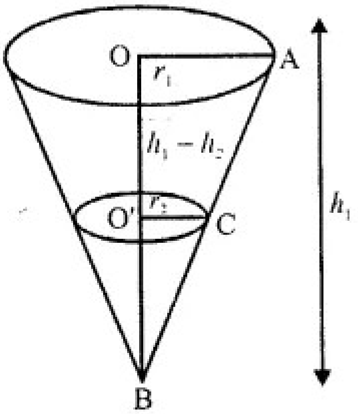
**If $r_1$ and $r_2$ denote the radii of the circular bases of the frustum of a cone such that $r_1 > r_2$ then write the ratio of the height of the cone of which the frustum is a part to the height of the frustum.**

**Solution:**

$r_1$ , $r_2$ are the radii of the bases of a frustum and $r_1 > r_2$

Let $h_1$ be the height of cone and $h_2$ be the height of smaller cone

∴ Height of frustum = $h_1 - h_2$




In $\Delta AOB$ and $\Delta O'BC$,

$\angle AOB = \angle CO'B$ (each 90°)

$\angle OBA = \angle O'BC$ (common)

$\therefore \Delta OAB \sim \Delta O'BC$

$$\therefore \frac{OB}{O'B} = \frac{OA}{O'C} \Rightarrow \frac{h_1}{h_2} = \frac{r_1}{r_2}$$

$O'O = OB - O'B = h_1 - h_2$

We have to find $\dfrac{OB}{OO'} = \dfrac{h_1}{h_1 - h_2}$

Now $\dfrac{r_1}{r_2} = \dfrac{h_1}{h_2} \Rightarrow \dfrac{h_2}{h_1} = \dfrac{r_2}{r_1}$

subtracting from 1,

$$1 - \frac{h_2}{h_1} = 1 - \frac{r_2}{r_1}$$

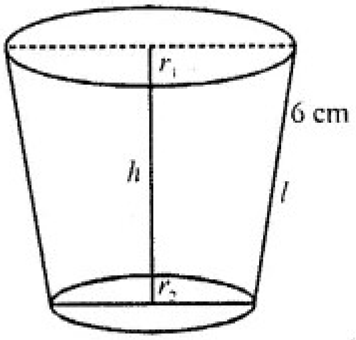
$$\Rightarrow \frac{h_1 - h_2}{h_1} = \frac{r_1 - r_2}{r_1}$$

$$\Rightarrow \frac{h_1}{h_1 - h_2} = \frac{r_1}{r_1 - r_2}$$ Hence.

**Question 20.**
**If the slant height of the frustum of a cone is 6 cm and the perimeters of its circular bases are 24 cm and 12 cm respectively. What is the curved surface area of the frustum ?**

**Solution:**
Slant height of a frustum (l) = 6 cm
Perimeter of upper base ($P_1$) = 24 cm

and perimeter of lower base ($P_2$) = 12 cm




$\therefore$ Upper radius $(r_1) = \frac{P_1}{2\pi} = \frac{24 \times 7}{2 \times 22} = \frac{42}{11}$ cm

and lower radius $(r_2) = \frac{P_2}{2\pi} = \frac{12 \times 7}{2 \times 22} = \frac{21}{11}$ cm

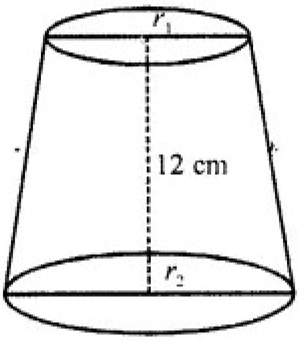
Now slant surface area $= \pi [r_1 + r_2] \times l$

$= \frac{22}{7}\left[\frac{42}{11} + \frac{21}{11}\right] \times 6 \text{ cm}^2$

$= \frac{22}{7}\left[\frac{63}{11}\right] \times 6 = 108 \text{ cm}^2$

**Question 21.**
**If the areas of circular bases of a frustum of a cone are 4 cm² and 9 cm² respectively and the height of the frustum is 12 cm. What is the volume of the frustum ?**
**Solution:**
In a frustum,
Area of upper base ($A_1$) = 4 cm²

and area of lower base ($A_2$) = 9 cm²




$$\therefore \text{ Radius of upper base } (r_1) = \sqrt{\frac{\text{Area}}{\pi}} = \sqrt{\frac{4}{\pi}}$$

$$= \frac{2}{\sqrt{\pi}} \text{ cm}$$

and radius of lower base ($r_2$)

$$= \sqrt{\frac{A}{\pi}} = \sqrt{\frac{9}{\pi}} = \frac{3}{\sqrt{\pi}}$$

Height ($h$) = 12 cm

$$\therefore \text{ Volume} = \frac{\pi}{3}(r_1^2 + r_1 r_2 + r_2^2) \times h$$

$$= \frac{\pi}{3}\left[\left(\frac{2}{\sqrt{\pi}}\right)^2 + \frac{2}{\sqrt{\pi}} \times \frac{3}{\sqrt{\pi}} + \left(\frac{3}{\pi}\right)^2\right] \times 12 \text{ cm}^3$$

$$= \frac{\pi}{3}\left[\frac{4}{\pi} + \frac{6}{\pi} + \frac{9}{\pi}\right] \times 12$$

$$= 4\pi\left[\frac{19}{\pi}\right] = 76 \text{ cm}^3$$

**Question 22.**
**The surface area of a sphere is 616 cm². Find its radius.**
**Solution:**
Surface area of a sphere = 616 cm²

Let r be the radius, then

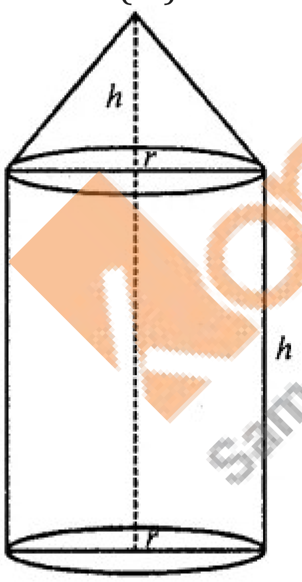
$$4\pi r^2 = 616 \Rightarrow \frac{4 \times 22}{7} r^2 = 616$$

$$\Rightarrow r^2 = \frac{616 \times 7}{4 \times 22} = 49 = (7)^2$$

$\therefore\ r = 7$

$\therefore$ Radius = 7 cm

**Question 23.**
**A cylinder and a cone are of the same base radius and of same height. Find the ratio of the value of the cylinder to that of the cone. [CBSE 2009]**
**Solution:**
Let r be the radius of the base of the cylinder
small as of cone
and let height of the cylinder = h
Then height of cone = h
∴ Volume of cylinder = $\pi r^2 h$
and volume of cone = (13) $\pi r^2 h$






$$\therefore\ \text{Ratio} = \pi r^2 h : \frac{1}{3}\pi r^2 h$$

$$= 1 : \frac{1}{3} = 3 : 1$$

**Question 24.**
**The slant height of the frustum of a cone is 5 cm. If the difference between the radii of its two circular ends is 4 cm, write the height of the frustum. [CBSE 2010]**
**Solution:**
Slant height of frustum (l) = 5 cm

Difference between the upper and lower radii = 4 cm
Let h be height and upper radius $r_1$ and lower radius = $r_2$

$$\therefore\ r_1 - r_2 = 4$$

$$\text{and } l = \sqrt{h^2 + (r_1 - r_2)^2} \Rightarrow l^2 = h^2 + (r_1 - r_2)^2$$

$$(5)^2 = h^2 + (4)^2$$

$$\Rightarrow 25 = h^2 + 16 \Rightarrow h^2 = 25 - 16 = 9 = (3)^2$$

$$\therefore\ h = 3$$

Hence height = 3 cm

**Question 25.**

**Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere?**

**Solution:**

Volume of hemisphere = Surface area of hemisphere (given)

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

$\therefore$ Diameter of hemisphere = $2r = 2(3) = 6$ cm