RIGHT CIR CYLINDER

1. The radii of two cylinders are in the ratio 2 : 7 and their heights are in the ratio 7: 3 what is the ratio of their volumes :

(A) 7 : 16 (B) 10 : 9 (C) 4 : 21 (D) 27 : 20

Sol. **(C)**

Let the radii of two cylinders be $2r$ and $3r$ respectively and their height be $5h$ and $3h$ respectively then the ratio of their volumes. $= \dfrac{\Pi(2r)^2(7h)}{\Pi(7r)^2(3h)} = 4/21$

2. A cylindrical rod whose height is 16 times of its radius is melted and recast into spherical balls of same radius. The number of balls will be.

(A) 4 (B) 3 (C) 12 (D) 8

Sol. **(C)**

Let the radius of the cylindrical rod is r and height is $16r$

Volume of the cylindrical rod $= \pi r^2 (16r) = 16\pi r^3$

Volume of one spherical ball of same radius $= \dfrac{4}{3}\pi r^3$

$$\text{No. of balls} = \frac{16\Pi r^3}{4/3\Pi r^3} = 12$$

3. Two cylinder of same volume have their heights in the ratio 25 : 36 .Find the ratio of their radii.

(A) 6:5 (B) $\sqrt{2}$: 1 (C) $\sqrt{5}$: 2 (D) 2 : $\sqrt{5}$

Sol. **(A)**

Let the radii of two cylinders be r_1 and r_2 respectively. Again Let their heights be $25h$ and $36h$ respectively. Their volumes are same.

$\Rightarrow$

$\Rightarrow$ $\left(\dfrac{r_1}{r_2}\right)^2 = 36/25$

$$\frac{r_1}{r_2} = 6/5$$

4. The sphere has the same volume as a cylinder whose height is equal to the diameter of its cross section, then the ratio of their radii is $\sqrt[3]{a/b}$, find a+b.

(A) 6 (B) 4 (C) 8 (D) 5

Sol. **(D)**

$$\text{Volume of the sphere} = \frac{4}{3}\pi r_1^3 = v_1 \qquad \text{(Let suppose)}$$

$$\text{Volume of the given cylinder} = \pi r_2^2(2r_2) = v_2 \qquad \text{(Let suppose)}$$

Given that $v_1 = v_2$

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

$$\Rightarrow \quad \left(\frac{r_1}{r_2}\right)^3 = \frac{2\pi}{4\pi}\times 3 \Rightarrow \frac{r_1}{r_2} = \sqrt[3]{\frac{3}{2}}$$

5. A cylindrical piece of iron of radius 7 cm and height 21cm is shaped into a cone of same radius. The height of cone is :

(A) 63 cm (B) 14 cm (C) 12 cm (D) 8 cm

Sol. **(A)**

Volume of the cylindrical piece of metal $= \pi(7)^2 \times 21\ \text{cm}^3$

$$\text{Volume of the cone} = \frac{1}{3}\Pi(7)^2 h,$$

Hence h is the height of the cone.

Given that their volume is same then $\pi(7)^2 \times 21 = \frac{1}{3}\Pi(7)^2 h$

$$\Rightarrow \quad h = 63 \text{ cm.}$$

6. If the heights and the radii of two circular cylinders are in the ratio 2 : 3 and 4 : 5 respectively. Find the ratio of their curved surface areas.

(A) 8 : 15 (B) 5 : 6 (C) 5 : 8 (D) 2 : 5

Sol. **(A)**

Let the heights and the radii of two circular cylinders be $2h$, $3h$ and $4r$, $5r$ respectively.

Then the ratio of their curved surface areas will be

$$= \frac{2\pi(4r)(2h)}{2\pi(5r)(3h)} = \frac{8}{15} = 8:15.$$

7.. A hollow cylindrical tube open at both ends is made of iron 2 cm thick. If the internal diameter be 12 cm and the length of the tube be 50 cm, find the volume of iron in it.

(A) 4000 cu cm (B) 4400 cu cm (C) 5600 cu cm (D) None of these

Sol. **(B)**

$$\text{Volume of the iron} = \pi(6+2)^2 \times 50 - \pi(6)^2 \times 50$$

$$= \frac{22}{7} \times 50.(64 - 36) = 4400\ \text{cm}^3.$$

8.. A sphere is melted to form a cylinder whose height is 9/2 times its radius. What is the ratio of radii of sphere to the cylinder ?

(A) 3 : 1 (B) 7 : 4 (C) 3:2 (D) none of these

Sol. **(C)**

Sol. **(C)**

$$\text{Volume of the sphere} = \frac{4}{3}\pi r^3$$

and $\text{volume of the cylinder} = \Pi(R)^2(9/2R)$ where

r and R are radii of sphere and cylinder respectively.

Now $$\frac{4}{3}\pi r^3 = \Pi(R)^2(9/2R)$$

$\Rightarrow$ $$\frac{r^3}{R^3} = 27/8$$

$$r/R=3/2$$

9. The ratio of radii of two cylinders is $1 : \sqrt{3}$ and heights are in the ratio 2 : 3. The ratio of their volumes is .....

(A) 1 : 9 (B) 4 : 9 (C) 2 : 9 (D) 5 : 9

Sol. **(C)**

Let the radii of two cylinders be r and $\sqrt{3}r$ and heights be $2h$ and $3h$ respectively them the ratio of their volumes will be

$$\frac{\pi r^2(2h)}{\pi(\sqrt{3}h)^2(3h)} = \frac{2}{9} = 2:9.$$

10.. A cone, a cylinder and a sphere are of the same height and same radius then the ratio of their curved surfaces is :

(A) $4 : \sqrt{5} : 4$ (B) $\sqrt{5} : 4 : 4$ (C) $4 : 4 : \sqrt{5}$ (D) None

Sol. **(C)**

As Given that height of all three are same, so if r be the radius and h be the height then

$$h = 2r$$

Now C.S.A. of the sphere $= 4\pi r^2$

C.S.A. of the cylinder $= 2\pi rh = 2\pi r\,(2r) = 4\pi r^2$

C.S.A. of the cone $= \pi r\sqrt{r^2+h^2} = \pi r\sqrt{r^2+(2r)^2} = \sqrt{5}\pi r^2$

So their ratios are $4\pi r^2 : 4\pi r^2 : \sqrt{5}\pi r^2$

$\Rightarrow$ $4 : 4 : \sqrt{5}$