Surface Areas and Volumes Ex.16.2 Q19

Answer :

We have to find the outer and inner radius of a hollow pipe.

Radius of inner pipe be (r_1)

Radius of outer cylinder be (r_2)

Length of the cylinder $(h) = 14$ cm

Difference between the outer and the inner surface area is 44 cm^2

So,

$$2\pi h(r_2 - r_1) = 44$$

$$2\left(\frac{22}{7}\right)(14)(r_2 - r_1) = 44$$

So,

$$(r_2 - r_1) = \frac{1}{2} \ldots\ldots (1)$$

So, volume of metal used is 99 cm^3 , so,

$$\pi h\left(r_2^2 - r_1^2\right) = 99$$

$$\left(\frac{22}{7}\right)(14)(r_2 - r_1)(r_2 + r_1) = 99$$

Use equation (1) in the above to get,

$$\left(\frac{22}{7}\right)(14)\left(\frac{1}{2}\right)(r_2 + r_1) = 99$$

Therefore,

$$(r_2 + r_1) = \frac{9}{2} \ldots\ldots (2)$$

Solve equation (1) and (2) to get,

$$\boxed{\begin{aligned} r_2 &= \frac{5}{2} \text{ cm} \\ r_1 &= 2 \text{ cm} \end{aligned}}$$

Surface Areas and Volumes Ex.16.2 Q20

Answer :

We have to find the number of cones which can be filled using the ice cream in the cylindrical vessel.

Radius of the cylinder $(r_1) = 6$ cm

Height of cylinder $(h) = 15$ cm

Radius of cone and the hemisphere on it $(r_2) = 3$ cm

Height of cone $(l) = 12$ cm

Let '*n*' number of cones filled. So we can write it as,

$n(\text{Volume of each cone}) = \text{Volume of cylinder}$

So,

$$(n)\left(\frac{1}{3}\pi r_2^2 l + \frac{2}{3}\pi r_2^3\right) = \pi r_1^2 h$$

$$(n)\left(\frac{r_2^2(l+2r_2)}{3}\right) = r_1^2 h$$

Now put the values to get,

$$(n)\left(\frac{9(12+6)}{3}\right) = 36(15)$$

$$54n = 540$$

Therefore, $\boxed{n = 10}$

Surface Areas and Volumes Ex.16.2 Q21

Answer :

We have to find the mass of a pole having a cylindrical base surmounted by a cone.

Radius of cone and cylinder $(r) = 6$ cm

Height of cylinder $(h) = 110$ cm

Height of cone $(l) = 9$ cm

So volume of the pole is,

$$= \pi r^2 h + \frac{1}{3}\pi r^2 l$$

$$= \pi r^2\left(h + \frac{1}{3}l\right)$$

Put the values to get,

$$= \left(\frac{22}{7}\right)(36)(110+3)\ \text{cm}^3$$

$$= 12785.14\ \text{cm}^3$$

Mass of $1\ \text{cm}^3$ of iron is 8 gm.

Therefore mass of the iron,

$$= (12785.14)(8)\ \text{gm}$$

$$= \boxed{102.2\ \text{kg}}$$

********** END **********