## Surface Areas and Volumes Ex.16.1 Q4

**Answer:**

The brass volume that has to be drawn into a cylindrical wire is given is $2.2 \text{ dm}^3 = 2.2 \times 10^{-3} \text{ m}^3$

We have to make a cylindrical wire out of it with diameter = 0.25 cm

So the radius of this wire $0.125 \times 10^{-2} \text{ m}$

We have to find the length of this wire.

Let the length of this wire be $h$

We know that the volume of a cylinder $= \pi r^2 h$.

We know, the volume of the cylinder should be equal to the volume of the given brass

$$\Rightarrow \pi \left(0.125 \times 10^{-2}\right)^2 \times h = 2.2 \times 10^{-3}$$

$$h = \frac{22 \times 10^{-3} \times 10^4}{\pi \times .125 \times .125}$$

$$= \frac{22 \times 7}{22 \times .125 \times .125}$$

$$= \frac{4 \times 7}{.25 \times .25}$$

$$= 448$$

Therefore, $h = 448$ m

Hence, the length of the cylindrical wire that can be formed is 448 m

## Surface Areas and Volumes Ex.16.1 Q5

**Answer:**

We are given a solid cylinder of, diameter = 2 cm

We have to recast it into a hollow cylinder of length = 16 cm

External Diameter = 20 cm and thickness = 2.5 mm = 0.25 cm

We have to find the height of the solid cylinder that can be used to get a hollow cylinder of the desired dimensions.

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

So,

The volume of the given solid cylinder $= \pi \left(1\right)^2 h$ ...... (a)

Here, height $h$ has to be found.

Volume of a hollow cylinder $= \pi h \left(R^2 - r^2\right)$

Where $R$ is the external radius and $r$ is the internal radius

External radius is given. Thickness of the hollow cylinder is also given.

So, we can find the internal radius of the hollow cylinder.

Thickness $= R - r$

$$\Rightarrow 0.25 = 10 - r$$

$$\Rightarrow r = 9.75 \text{ cm}$$

So, the volume of the hollow cylinder $= \pi \times 16 \times \left(100 - 95.0625\right)$ ...... (b)

From (a) and (b) we get,

$$\pi \left(1\right)^2 h = \pi \times 16 \times \left(100 - 95.0625\right)$$

$$\cancel{\pi} h = \cancel{\pi} \times 16 \times \left(100 - 95.0625\right)$$

$$h = 16 \times \left(4.9375\right)$$

$$h = 79 \text{ cm}$$

Hence, the required height of the solid cylinder is $h = 79$ cm

## Surface Areas and Volumes Ex.16.1 Q6

**Answer :**

A cylindrical vessel whose height is equal to its diameter is given.

It is filled with water.

We know that the volume of a cylinder $= \pi r^2 h$

In this particular case,

Height is equal to the diameter, that is $h = 2r$,

The volume of cylindrical vessel becomes $= 2\pi r^3$

The water from this vessel is transferred into two identical cylindrical vessels of

Diameter = 42 cm and, height $h$ = 21 cm

Volume of each vessel $= \pi (21)^2 \times 21$

We know that the sum of the volumes of the two identical vessels must be equal to the volume of the given cylindrical vessel.

$$\Rightarrow 2\pi r^3 = 2 \times \left( \pi (21)^2 \times 21 \right)$$

$$r^3 = (21)^3$$

Therefore, $r = 21$

The diameter of the given cylinder is 42 cm

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