



Surface Areas and Volumes Ex.16.1 Q41

Answer :

The internal radius of the pipe is 10 cm = 0.1 m. The water is flowing in the pipe at 3 km/hr = 3000 m/hr.

Let the cylindrical tank will be filled in t hours. Therefore, the length of the flowing water in t hours is
 $= 3000 \times t$ meter

Therefore, the volume of the flowing water is

$$V_1 = \pi \times (0.1)^2 \times 3000 \times t \text{ m}^3$$

The radius of the cylindrical tank is 5 m and the height is 2 m. Therefore, the volume of the cylindrical tank is

$$V_2 = \pi \times (5)^2 \times 2 \text{ m}^3$$

Since, we have considered that the tank will be filled in t hours; therefore the volume of the flowing water in t hours is same as the volume of the cylindrical tank. Hence, we have

$$V_1 = V_2$$

$$\Rightarrow \pi \times (5)^2 \times 2 = \pi \times (0.1)^2 \times 3000 \times t$$

$$\Rightarrow t = \frac{(5)^2 \times 2}{(0.1)^2 \times 3000}$$

$$\Rightarrow t = \frac{5}{3} \text{ hours}$$

$$t = \frac{5 \times 60}{3} = 100 \text{ minut}$$

Hence, the tank will be filled in **1 hour 40 minutes**

Surface Areas and Volumes Ex.16.1 Q42

Answer :

The inner radius of the well is $\frac{3}{2}$ m and the height is 14 m. Therefore, the volume of the Earth taken out of it is

$$V_1 = \pi \times \left(\frac{3}{2}\right)^2 \times 14 \text{ m}^3$$

The inner and outer radii of the embankment are $\frac{3}{2}$ m and $4 + \frac{3}{2} = \frac{11}{2}$ m respectively. Let the height of the embankment be h . Therefore, the volume of the embankment is

$$V_2 = \pi \times \left\{ \left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2 \right\} \times h \text{ m}^3$$

Since, the volume of the well is same as the volume of the embankment; we have

$$V_1 = V_2$$

$$\Rightarrow \pi \times \left(\frac{3}{2}\right)^2 \times 14 = \pi \times \left\{ \left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2 \right\} \times h$$

$$\Rightarrow h = \frac{9 \times 14}{112}$$

$$\Rightarrow h = \frac{9}{8} \text{ m}$$

Hence, the height of the embankment is **$h = \frac{9}{8}$ m**

Surface Areas and Volumes Ex.16.1 Q43

Answer :

The surface area of the metallic sphere is 616 square cm. Let the radius of the metallic sphere is r .

Therefore, we have

$$4\pi r^2 = 616$$

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

$$\Rightarrow r^2 = 7 \times 7$$

$$\Rightarrow r = 7$$

Therefore, the radius of the metallic sphere is 7 cm and the volume of the sphere is

$$V_1 = \frac{4}{3}\pi \times (7)^3 \text{ cm}^3$$

The sphere is melted to recast a cone of height 28 cm. Let the radius of the cone is R cm. Therefore, the volume of the cone is

$$V_2 = \frac{1}{3}\pi \times (R)^2 \times 28 \text{ cm}^3$$

Since, the volumes of the sphere and the cone are same; we have

$$V_1 = V_2$$

$$\Rightarrow \frac{4}{3}\pi \times (7)^3 = \frac{1}{3}\pi \times (R)^2 \times 28$$

$$\Rightarrow R^2 = \frac{4 \times (7)^3}{28}$$

$$\Rightarrow R^2 = 7^2$$

$$\Rightarrow R = 7$$

Hence, the diameter of the base of the cone so formed is two times its radius, which is **14** cm.

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