



Surface Areas and Volumes Ex.16.1 Q29

Answer :

Let the radius of the big metallic ball is $4r$. Therefore, the volume of the big metallic ball is

$$V = \frac{4}{3} \pi \times (4r)^3$$

The metallic sphere is melted to produce small balls of radius $\frac{4r}{4} = r$. Then, the volume of each of the small balls is

$$V_1 = \frac{4}{3} \pi \times (r)^3$$

Since, the volume of the big metallic ball is equal to the sum of the volumes of the small balls, we have the number of produced small balls is

$$\begin{aligned} \frac{V}{V_1} &= \frac{\frac{4}{3} \pi \times (4r)^3}{\frac{4}{3} \pi \times (r)^3} \\ &= (4)^3 \\ &= 64 \end{aligned}$$

Hence, the number of small balls is 64

The surface area of the big ball is

$$S = 4\pi \times (4r)^2$$

The surface area of each of the small ball is

$$S_1 = 4\pi \times (r)^2$$

Therefore, the total surface area of the 64 small balls is

$$S_2 = 64 \times 4\pi \times (r)^2$$

Now, we compute the following ratio

$$\begin{aligned} \frac{S_2}{S} &= \frac{64 \times 4\pi \times (r)^2}{4\pi \times (4r)^2} = 4 \\ \Rightarrow S_2 &= 4S \end{aligned}$$

Hence, the total surface area of the small balls is equal to four times the surface area of the original big ball.

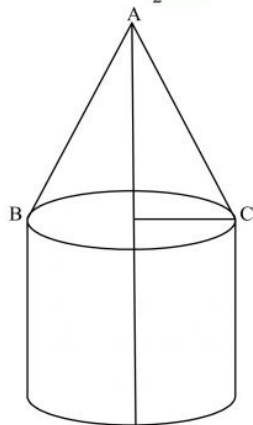
Surface Areas and Volumes Ex.16.1 Q30

Answer :

The height of the tent is 77dm = 7.7m. The height of the upper portion of the tent is

44dm = 4.4m. Therefore, the height of the cylindrical part is $77 - 44 = 33$ dm = 3.3m. The radius of the

cylindrical part is $\frac{36}{2} = 18$ m.



Let the slant height of the cone part is l m. Then, we have

$$l^2 = (18)^2 + (3.3)^2$$

$$\Rightarrow l^2 = 324 + 10.89 = 334.89$$

$$\Rightarrow l = 18.3$$

Therefore, the slant height of the cone part is 18.3 m.

The curved surface area of the cylindrical part is

$$S = 2\pi \times 18 \times 4.4 \text{ m}^2$$

The curved surface area of the cone part is

$$S_1 = \pi \times 18 \times 18.3 \text{ m}^2$$

Therefore, the total curved surface area of the tent is

$$S + S_1 = 2\pi \times 18 \times 4.4 + \pi \times 18 \times 18.3$$

$$= 18\pi(8.8 + 18.3)$$

$$= 18\pi \times 27.10$$

The cost of canvas per m^2 is Rs 3.50. Hence, the total cost for canvas in Rs is

$$= 18 \times \frac{22}{7} \times 27.10 \times 3.50$$

$$= 5365.80$$

Hence total cost is Rs.5365.80

Surface Areas and Volumes Ex.16.1 Q31

Answer :

The radius of each of the metallic sphere is 2cm. Therefore, the volume of each metallic sphere is

$$V = \frac{4}{3}\pi \times (2)^3 \text{ cm}^3$$

The total volume of the 16 spheres is

$$V_1 = 16 \times \frac{4}{3}\pi \times (2)^3 \text{ cm}^3$$

The internal dimension of the rectangular box is $16\text{cm} \times 8\text{cm} \times 8\text{cm}$. Therefore, the volume of the rectangular box is

$$V_2 = 16 \times 8 \times 8 \text{ cm}^3$$

Therefore, the volume of the liquid is

$$V_2 - V_1 = 16 \times 8 \times 8 - 16 \times \frac{4}{3}\pi \times (2)^3$$

$$= 1024 - 536.03$$

$$= 488$$

Hence volume of liquid is 488 cm^3

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