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

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

$$= (4)^3$$

$$= 64$$

Hence, the number of small balls is $\boxed{64}$

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

$$\frac{S_2}{S} = \frac{64 \times 4\pi \times (r)^2}{4\pi \times (4r)^2} = 4$$

$$\Rightarrow S_2 = 4S$$

Hence, the total surface area of the small balls is equal to four times the surface area of the original big ball.
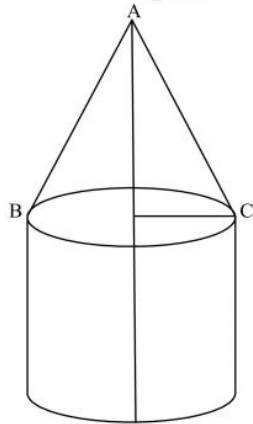
Surface Areas and Volumes Ex.16.1 Q30

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

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

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

$\Rightarrow \quad l = 18.3$

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

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

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

$\qquad = 18\pi \times 27.10$

The cost of canvas per m² is Rs 3.50. Hence, the total cost for canvas in Rs is

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

$= 5365.80$

Hence total cost is $\boxed{\text{Rs.5365.80}}$

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

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

The total volume of the 16 spheres is

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

The internal dimension of the rectangular box is 16cm × 8cm × 8cm. 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

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

$\qquad = 1024 - 536.03$

$\qquad = 488$

Hence volume of liquid is $\boxed{488 \text{ cm}^3}$

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