Surface Area and volume of A Right Circular cone Ex 20.2 Q14

Answer :

The formula of the volume of a cone with base radius 'r' and vertical height 'h' is given as

Volume of cone $= \frac{1}{3}\pi r^2 h$

It is given that the top diameter is 3.5 m. Hence the radius of the conical pit is $\frac{3.5}{2}$ m.

Substituting the values of $r = \frac{3.5}{2}$ m and $h = 12$ m in the above equation and using $\pi = \frac{22}{7}$ we get

$$\begin{aligned}\text{Volume} &= \frac{(22)(3.5)(3.5)(12)}{(7)(3)(2)(2)}\\ &= 22\times 0.5\times 3.5\\ &= 38.5\end{aligned}$$

Hence the volume of the conical pit is 38.5 m^3 or $\boxed{38.5 \text{ kilo litre}}$

Surface Area and volume of A Right Circular cone Ex 20.2 Q15

Answer :

Given that out of the 551 m^2, 1 m^2 has to be used for stitching, etc we are left with 550 m^2 of canvas to make a tent.

The amount of canvas needed to make the conical tent would be equal to the curved surface area of the conical tent.

The formula of the curved surface area of a cone with base radius 'r' and slant height 'l' is given as

Curved Surface Area $= \pi r l$

Here the C.S.A = 550 m^2 and the base radius 'r' = 7 m. We can get the slant height 'l' of the tent by using the formula for curved surface area.

$$\begin{aligned}l &= \frac{\text{Curved Surface Area}}{\pi r}\\ &= \frac{(550)(7)}{(22)(7)}\\ &= 25\end{aligned}$$

Hence the slant height of the conical tent is 25 m.

The height 'h' can be found out using the relation between r, l and h.

We know that in a cone

$$\begin{aligned}l^2 &= r^2 + h^2\\ h^2 &= l^2 - r^2\\ h &= \sqrt{l^2 - r^2}\\ &= \sqrt{25^2 - 7^2}\\ &= \sqrt{625 - 49}\\ &= \sqrt{576}\\ &= 24\end{aligned}$$

Hence the height of the conical tent is 24 m.

The formula of the volume of a cone with base radius 'r' and vertical height 'h' is given as

Volume of cone $= \frac{1}{3}\pi r^2 h$

Substituting the values of $r = 7$ m and $h = 24$ m in the above equation and using $\pi = \frac{22}{7}$ we get,

$$\begin{aligned}\text{Volume} &= \frac{(22)(7)(7)(24)}{(7)(3)}\\ &= (22)\ (7)\ (8)\\ &= 1232\end{aligned}$$

Hence the volume of the conical tent that can be made out of the given canvas with the given dimensions is $\boxed{1232 \text{ m}^3}$

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