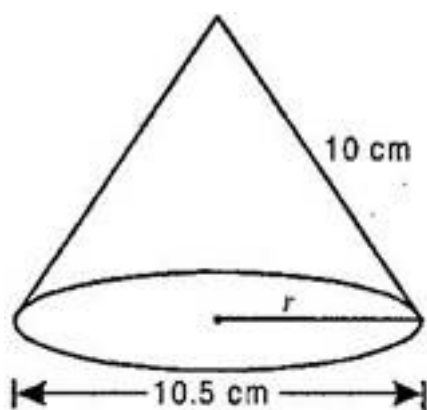


CBSE Class 9 Mathematics
NCERT Solutions
CHAPTER 13
Surface Areas and Volumes(Ex. 13.3)

Assume $\frac{22}{7}$ unless stated otherwise.

1. Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area and its total surface area.

Ans. Diameter of cone = 10.5 cm



$$\Rightarrow \text{Radius of cone (r)} = \frac{10.5}{2} = \frac{21}{4} \text{ cm}$$

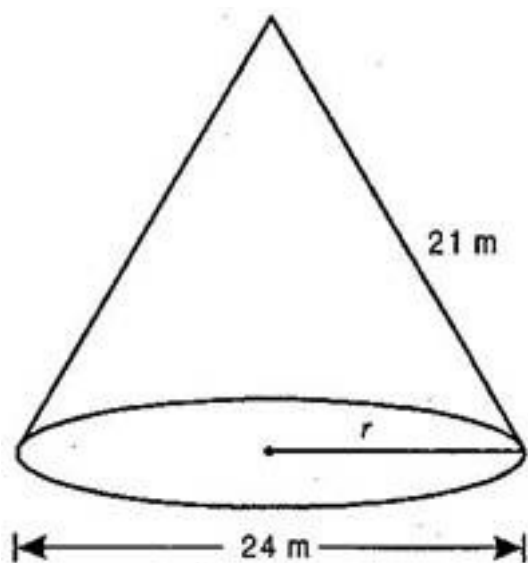
Slant height of cone (l) = 10 cm

$$\text{Curved surface area of cone} = \pi r l = \frac{22}{7} \times \frac{21}{4} \times 10 = 165 \text{ cm}^2$$

2. Find the total surface area of a cone, if its slant height is 21 cm and diameter of the base is 24 cm.

Ans. Slant height of cone (l) = 21 m

Diameter of cone = 24 m



$$\Rightarrow \text{Radius of cone } (r) = \frac{24}{2} = 12 \text{ m}$$

$$\text{Total surface area of cone} = \pi r(l + r)$$

$$= \frac{22}{7} \times 12(21 + 12)$$

$$= \frac{264}{7} \times 33 = 1244.57 \text{ m}^2$$

3. Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find (i) radius of the base and (ii) total surface area of the cone.

Ans. (i) Slant height of cone $(l) = 14 \text{ cm}$

$$\text{Curved surface area of cone} = 308 \text{ cm}^2$$

$$\Rightarrow \pi r l = 308$$

$$\Rightarrow \frac{22}{7} \times r \times 14 = 308$$

$$\Rightarrow r = \frac{308 \times 7}{14 \times 22}$$

$$\Rightarrow r = 7 \text{ cm}$$

(ii) Total surface area of the cone

= Curved surface area + Area of circular base

$$= 308 + \pi r^2$$

$$= 308 + \frac{22}{7} \times (7)^2$$

$$= 308 + 154 = 462 \text{ cm}^2$$

4. A conical tent is 10 m high and the radius of its base is 24 m. Find:

(i) slant height of the tent.

(ii) cost of the canvas required to make the tent, if the cost of 1 m² canvas is Rs. 70.

Ans. Height of the conical tent (h) = 10 m

Radius of the conical tent (r) = 24 m

(i) Slant height of the tent (l) = $\sqrt{r^2 + h^2}$

$$= \sqrt{(24)^2 + (10)^2}$$

$$= \sqrt{576 + 100} = \sqrt{676} = 26 \text{ m}$$

(ii) Canvas required to make the tent

= Curved surface area of the tent = $\pi r l$

$$= \frac{22}{7} \times 24 \times 26 = \frac{13728}{7} \text{ m}^2$$

\therefore Cost of 1 m² canvas = Rs. 70

$$\therefore \text{Cost of } \frac{13728}{7} \text{ m}^2 \text{ canvas} = 70 \times \frac{13728}{7} = \text{Rs. } 137280$$

5. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm. (Use $\pi = 3.14$)

Ans. Height of the conical tent (h) = 8 m and Radius of the conical tent (r) = 6 m

$$\text{Slant height of the tent } (l) = \sqrt{r^2 + h^2}$$

$$= \sqrt{(6)^2 + (8)^2} = \sqrt{36 + 64} = \sqrt{100} = 10 \text{ m}$$

$$\text{Area of tarpaulin} = \text{Curved surface area of tent} = \pi r l = 3.14 \times 6 \times 10 = 188.4 \text{ m}^2$$

$$\text{Width of tarpaulin} = 3 \text{ m}$$

$$\text{Let Length of tarpaulin} = L$$

$$\therefore \text{Area of tarpaulin} = \text{Length} \times \text{Breadth}$$

$$= L \times 3 = 3L$$

Now According to question,

$$3L = 188.4$$

$$\Rightarrow L = \frac{188.4}{3} = 62.8 \text{ m}$$

The extra length of the material required for stitching margins and cutting is 20 cm = 0.2 m.

So the total length of tarpaulin bought is (62.8 + 0.2) m = 63 m

6. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of white-washing its curved surface at the rate of Rs. 210 per 100 m².

Ans. Slant height of conical tomb (l) = 25 m,

Diameter of tomb = 14 m

$$\therefore \text{Radius of the tomb } (r) = \frac{14}{2} = 7 \text{ m}$$

Curved surface area of tomb = πrl

$$= \frac{22}{7} \times 7 \times 25 = 550 \text{ m}^2$$

\therefore Cost of white washing 100 m^2 = Rs. 210

$$\therefore \text{Cost of white washing } 1 \text{ m}^2 = \frac{210}{100}$$

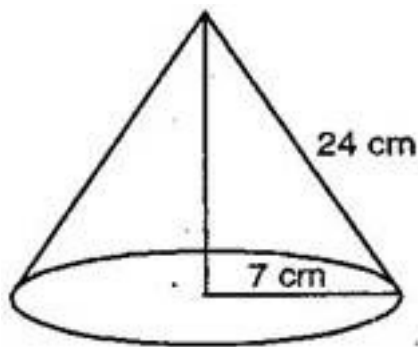
\therefore Cost of white washing 550 m^2

$$= \frac{210}{100} \times 550 = \text{Rs. } 1155$$

7. A Joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.

Ans. Radius of cap (r) = 7 cm,

Height of cap (h) = 24 cm



Slant height of the cone $(l) = \sqrt{r^2 + h^2}$

$$= \sqrt{(7)^2 + (24)^2}$$

$$= \sqrt{49 + 576} = \sqrt{625} = 25 \text{ cm}$$

Area of sheet required to make a cap

$$= \text{CSA of cone} = \pi r l$$

$$= \frac{22}{7} \times 7 \times 25 = 550 \text{ cm}^2$$

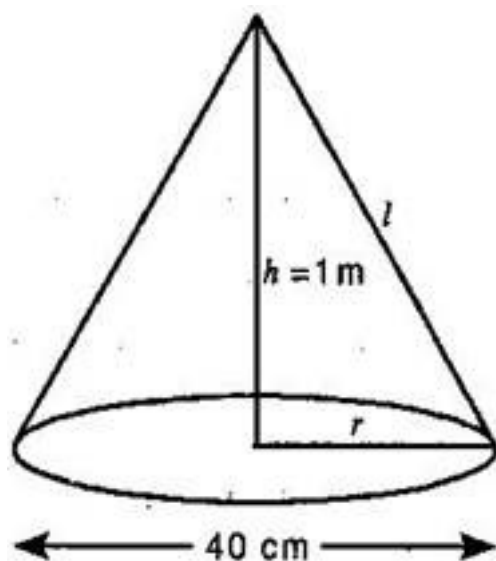
$$\therefore \text{Area of sheet required to make 10 caps} = 10 \times 550 = 5500 \text{ cm}^2$$

8. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is Rs. 12 per m^2 , what will be the cost of painting all these cones?

(Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$)

Ans. Diameter of cone = 40 cm

$$\Rightarrow \text{Radius of cone } (r) = \frac{40}{2} = 20 \text{ cm} = \frac{20}{100} \text{ m} = 0.2 \text{ m}$$



Height of cone (h) = 1 m

Slant height of cone (l) = $\sqrt{r^2 + h^2}$

$$= \sqrt{(0.2)^2 + (1)^2} = \sqrt{0.04 + 1} = \sqrt{1.04} \text{ m} = 1.02 \text{ m}$$

$$\text{Curved surface area of cone} = \pi r l = 3.14 \times 0.2 \times 1.02 = 0.64056 \text{ m}^2$$

∴ Cost of painting 1 m^2 of a cone = Rs. 12

∴ Cost of painting 0.64056 m^2 of a cone = 12×0.64056 = Rs. 7.68672

∴ Cost of painting of 50 such cones = 50×7.68672 = Rs. 384.34 (approx.)