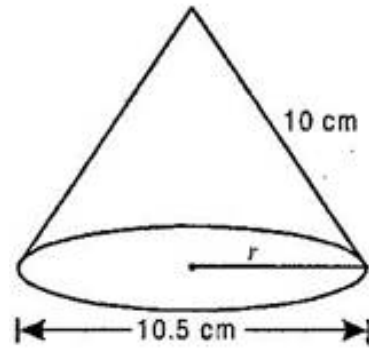NCERT solutions for class-9 maths surface areas and volumes Ex 13.3

Assume $\pi = \dfrac{22}{7}$ unless stated otherwise.

Q1. 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 = 10.5 cm

$\Rightarrow$ Radius $(r) = \dfrac{10.5}{2} = \dfrac{21}{4}$ cm

Slant height of cone $(l) = 10$ cm

Curved surface area of cone $= \pi r l$

$= \dfrac{22}{7} \times \dfrac{21}{4} \times 10 = 165\ \text{cm}^2$

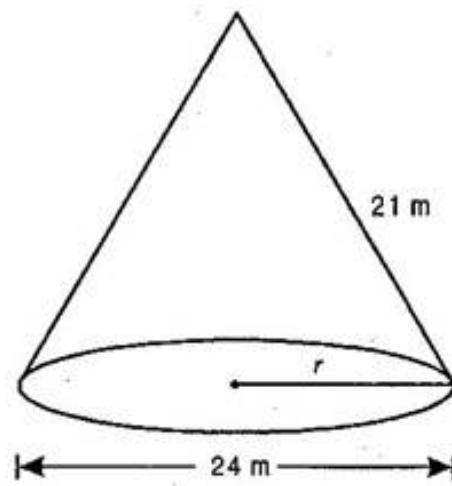Total surface area of cone $= \pi r (l + r)$

$= \dfrac{22}{7} \times \dfrac{21}{4}\left(10 + \dfrac{21}{4}\right)$

$= \dfrac{22}{7} \times \dfrac{21}{4} \times \dfrac{61}{4} = 251.625\ \text{cm}^2$

Q2. 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

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

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

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

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

Q3. Curved surface area of a cone is 308 cm² 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 $(l) = 14$ cm

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

$\Rightarrow \pi r l = 308$

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

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

$\Rightarrow r = 7$ cm

(ii) Total surface area of the cone

= Curved surface area + Area of circular base

$= 308 + \pi r^2$

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

$= 462 \text{ cm}^2$

Q4. 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 a 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 m

(ii) Canvas required to make the tent

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

$= \dfrac{22}{7} \times 24 \times 26 = \dfrac{13728}{7}$ m²

∵ Cost of 1 m² canvas = Rs. 70

∴ Cost of $\dfrac{13728}{7}$ m² canvas

$= 70 \times \dfrac{13728}{7}$ = Rs. 137280

Q5. 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 π = 3.14)

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

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

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

Area of tarpaulin = Curved surface area of tent = $\pi r l$ = 3.14 x 6 x 10 = 188.4 m²

Width of tarpaulin = 3 m

Let Length of tarpaulin = L

∴ Area of tarpaulin = Length x Breadth

= L x 3 = 3L

Now According to question,

3L = 188.4

$$\Rightarrow L = \frac{1884.4}{3} = 62.8 \text{ m}$$

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

Q6. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of whitewashing 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

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

Curved surface are of tomb = $\pi r l$

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

$\because$ Cost of white washing 100 m²

= Rs. 210

$\therefore$ Cost of white washing 1 m² = $\dfrac{210}{100}$

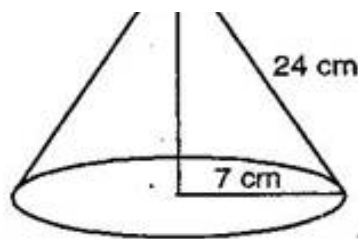$\therefore$ Cost of white washing 550 m²

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

Q7. 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

= CSA of cone = $\pi r l$

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

∴ Area of sheet required to make 10 caps = 10 x 550 = 5500 cm²

Q8. 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 m², what will be the cost of painting all these cones?

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

Ans: Diameter of cone = 40 cm

⇒ Radius of cone $(r) = \dfrac{40}{2}$ = 20 cm

$$= \frac{20}{100} \text{ m} = 0.2 \text{ m}$$
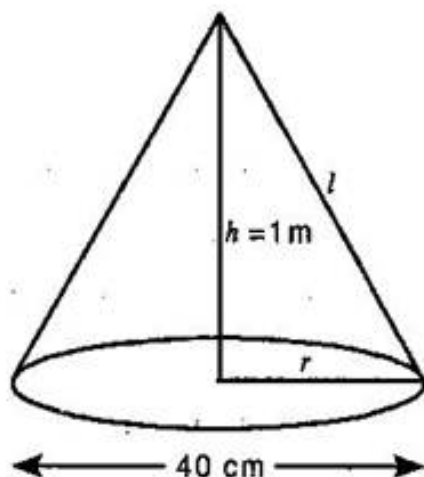
Height of cone $(h) = 1\,m$

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

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

Curved surface area of cone $= \pi r l$

$= 3.14 \times 0.2 \times \sqrt{1.04}$

$= 0.64056\ m^2$

∵ Cost of painting 1 m² of a cone

$=$ Rs. 12

∴ Cost of painting 0.64056 m² of a cone

$= 12 \times 0.64056 =$ Rs. 7.68672

∴ Cost of painting of 50 such cones

$= 50 \times 7.68672 =$ Rs. 384.34 (approx.)

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