CLASS IX: MATHS
Chapter 11: Surface Areas and Volume

Questions and Solutions | Exercise 11.1 - NCERT Books

Q1. Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area.

Sol. ∵ Diameter of the base = 10.5 cm

∴ Radius of the base (r) = $\frac{10.5}{2}$ cm = 5.25 cm

Slant height (ℓ) = 10 cm

∴ Curved surface area of the cone

= $\pi r\ell = \frac{22}{7} \times 5.25 \times 10 = 165$ cm^2.

Q2. Find the total surface area of a cone, if its slant height is 21 m and diameter of its base is 24 m.

Sol. ℓ = 21m, r = 12 m

Total surface area = $\pi r (r + \ell) = \frac{22}{7} \times 12 \times 33$ m^2

= 1244.57 m^2

Q3. 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.

Sol. (i) Slant height (ℓ) = 14 cm

Curved surface area = 308 cm^2

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

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

Hence, the radius of the base is 7 cm.

(ii) Total surface area of the cone $= \pi r(\ell + r) = \frac{22}{7} \times 7 \times (14 + 7) = \frac{22}{7} \times 7 \times 21 = 462 \text{ cm}^2$

Hence, the total surface area of the cone is 462 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 1 m^2 canvas is Rs. 70.

Sol. Height of the tent (h) = 10 m

Radius of the base (r) = 24 m

(i) The slant height, $\ell = \sqrt{h^2 + r^2}$

$\ell = \sqrt{(24)^2 + (10)^2}$ m $= \sqrt{576 + 100}$ m

$\ell = 26$ m

Thus, the required slant height of the tent is 26 m.

(ii) Curved surface area of the cone $= \pi r\ell$

$\therefore$ Area of the canvas required $= \frac{13728}{7} \text{m}^2$

$\therefore$ Cost of $\frac{13728}{7} \text{m}^2$ canvas

$= \text{Rs } 70 \times \frac{13728}{7} = \text{Rs } 137280$

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 $\pi = 3.14$)

Sol. Area of Tarpaulin required = Curved surface of the conical tent

$l = \sqrt{8^2 + 6^2} = 10\text{m}$

Area of tarpaulin = $3.14 \times 6 \times 10$

Acc. to quest = 188.4

3m × length = 188.4

length = 62.8m

wastage = 20cm = 0.2 m

Total length required = 62.8 + 0.2 = 63m

i.e., $\ell \times b = \pi r\ell$]

Ans. 63 m.

Q6. 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 m^2.

Sol. ℓ = 25 m, r = 7 m

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

Cost of white washing = Rs. $\frac{210}{100} \times 550$ = 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.

Sol. r = 7 cm, h = 24 cm $\ell^2 = h^2 + r^2$

$= 576 + 49 = 625 \Rightarrow \ell = 25$ cm

Sheet required for one cap

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

Sheet required for 10 caps = $10 \times 550\ cm^2 = 5500\ cm^2$

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 m^2, what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$)

Sol. Radius (r) = $\frac{40}{2}$ cm = $\frac{20}{100}$ m = 0.2 m

Height (h) = 1 m

Slant height (ℓ) = $\sqrt{r^2 + h^2} = \sqrt{(0.2)^2 + (1)^2}$

= 1.02 m.

Now, curved surface area = $\pi r \ell$

∴ Curved surface area of 1 cone

$= 3.14 \times 0.2 \times 1.02\ m^2$

$= \frac{314}{100} \times \frac{2}{10} \times \frac{102}{100} m^2$

Curved surface area of 50 cones

$$= 50 \times \left[\frac{314}{100} \times \frac{2}{10} \times \frac{102}{100}\right] m^2$$

$$= \frac{314 \times 102}{10 \times 100} m^2$$

Cost of painting per m^2 = Rs 12

$\therefore$ Cost of painting $\left[\frac{314 \times 102}{1000}\right] m^2$

$$= \frac{12 \times 314 \times 102}{1000} = \text{Rs } 384.34 \text{ (approx)}$$