



SpeedLabs

MATHS

CBSE 9th

TEEVRA EDUTECH PVT. LTD.

SURFACE AREAS AND VOLUMES

Exercise- 13.3

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

$$\left[\text{Assume } \pi = \frac{22}{7} \right]$$

Ans - Radius (r) of the base of cone = $\left(\frac{10.5}{2}\right)$ cm = 5.25 cm

Slant height (l) of cone = 10 cm

CSA of cone = $\pi r l$

$$= \left(\frac{22}{7} \times 5.25 \times 10\right) \text{cm}^2 = (22 \times 0.75 \times 10) \text{cm}^2 = 165 \text{cm}^2$$

Therefore, the curved surface area of the cone is 165 cm².

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

$$\left[\text{Assume } \pi = \frac{22}{7} \right]$$

Ans - Radius (r) of the base of cone = $\left(\frac{24}{2}\right)$ m = 12m

Slant height (l) of cone = 21 m

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

$$= \left[\frac{22}{7} \times 12 \times (12 + 21)\right] \text{m}^2$$

$$= \left(\frac{22}{7} \times 12 \times 33\right) \text{m}^2$$

$$= 1244.57 \text{m}^2$$

Q.3 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.

$$\left[\text{Assume } \pi = \frac{22}{7} \right]$$

Ans - (i) Slant height (l) of cone = 14 cm

Let the radius of the circular end of the cone be r.

We know, CSA of cone = $\pi r l$

$$(308) \text{cm}^2 = \left(\frac{22}{7} \times r \times 14\right) \text{cm}$$

$$\Rightarrow r = \left(\frac{308}{44}\right) \text{cm} = 7 \text{cm}$$

Therefore, the radius of the circular end of the cone is 7 cm.

(ii) Total surface area of cone = CSA of cone + Area of base

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

$$\left[308 + \frac{22}{7} \times (7)^2 \right] \text{cm}^2$$

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

$$= 462 \text{cm}^2$$

Therefore, the total surface area of the cone is 462cm^2 .

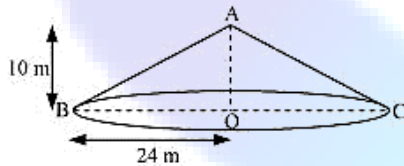
Q.4 A conical tent is 10 m high and the radius of its base is 24 m. Find

(i) slant height of the tent

(ii) cost of the canvas required to make the tent, if the cost of 1m^2 canvas is Rs 70.

$$\left[\text{Assume } \pi = \frac{22}{7} \right]$$

Ans -



(i) Let ABC be a conical tent.

Height (h) of conical tent = 10 m

Radius (r) of conical tent = 24 m

Let the slant height of the tent be l.

In ΔABO ,

$$AB^2 = AO^2 + BO^2$$

$$l^2 = h^2 + r^2$$

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

$$= 676 \text{ m}^2$$

$$\therefore l = 26 \text{ m}$$

Therefore, the slant height of the tent is 26 m.

(ii) CSA of tent = $\pi r l$

$$= \left(\frac{22}{7} \times 24 \times 26 \right) \text{m}^2$$

$$= \frac{13728}{7} \text{m}^2$$

Cost of 1m^2 canvas = Rs 70

$$\text{Cost of } \frac{13728}{7} \text{m}^2 \text{ canvas} = \text{Rs } \left(\frac{13728}{7} \times 70 \right)$$

$$= \text{Rs } 137280$$

Therefore, the cost of the canvas required to make such a tent is

Rs 137280.

Q.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 (h) of conical tent = 8 m

Radius (r) of base of tent = 6 m

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

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

CSA of conical tent = $\pi r l$

$$= (3.14 \times 6 \times 10) \text{ m}^2$$

$$= 188.4 \text{ m}^2$$

Let the length of tarpaulin sheet required be l.

As 20 cm will be wasted, therefore, the effective length will be (l – 0.2 m).

Breadth of tarpaulin = 3 m

Area of sheet = CSA of tent

$$[(l - 0.2 \text{ m}) \times 3] \text{ m} = 188.4 \text{ m}^2$$

$$l - 0.2 \text{ m} = 62.8 \text{ m}$$

$$l = 63 \text{ m}$$

Therefore, the length of the required tarpaulin sheet will be 63 m.

Q.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.

$$\left[\text{Assume } \pi = \frac{22}{7} \right]$$

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

Base radius (r) of tomb = $\frac{14}{2} = 7 \text{ m}$

CSA of conical tomb = $\pi r l$

$$= \left(\frac{22}{7} \times 7 \times 25 \right) \text{ m}^2$$

$$= 550 \text{ m}^2$$

Cost of white-washing 100 m² area = Rs 210

$$\text{Cost of white-washing } 550 \text{ m}^2 \text{ area} = \left(\frac{210 \times 550}{100} \right)$$

= Rs 1155

Therefore, it will cost Rs 1155 while white-washing such a conical tomb.

Q.7 A joker's cap is in the form of right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps. [Assume $\pi = \frac{22}{7}$]

Ans - Radius (r) of conical cap = 7 cm

Height (h) of conical cap = 24 cm

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

$$= \left[\sqrt{(7)^2 + (24)^2} \right] \text{ cm} = (\sqrt{625}) \text{ cm} = 25 \text{ cm}$$

CSA of 1 conical cap = $\pi r l$

$$= \left(\frac{22}{7} \times 7 \times 25 \right) \text{ cm}^2 = 550 \text{ cm}^2$$

CSA of 10 such conical caps = $(10 \times 550) \text{ cm}^2 = 5500 \text{ cm}^2$

Therefore, 5500 cm² sheet will be required.

Q.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 m², what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$).

Ans - Radius (r) = $\frac{40}{2}$ 20 cm = 0.2 m

Height (h) of cone = 1 m

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

$$= \left[\sqrt{(1)^2 + (0.2)^2} \right] \text{ m} = (\sqrt{1.04}) \text{ m} = 1.02 \text{ m}$$

CSA of each cone = $\pi r l$

$$= (3.14 \times 0.2 \times 1.02) \text{ m}^2 = 0.64056 \text{ m}^2$$

CSA of 50 such cones = $(50 \times 0.64056) \text{ m}^2$

$$= 32.028 \text{ m}^2$$

Cost of painting 1 m² area = Rs 12

Cost of painting 32.028 m² area = Rs (32.028×12)

$$= \text{Rs } 384.336$$

$$= \text{Rs } 384.34 \text{ (approximately)}$$

Therefore, it will cost Rs 384.34 in painting 50 such hollow cones.