

NCERT Solutions for Class 9 Maths Chapter 11 Surface Areas and Volumes Ex 11.3

Question 1.

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

Solution.

$$\text{Radius (r) of the base of cone} = \frac{10.5}{2}$$

$$= 5.25 \text{ cm}$$

$$\text{Slant height (l) of cone} = 10 \text{ cm}$$

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

$$= \frac{22}{7} * 5.25 * 10$$

$$= 22 * 0.75 * 10$$

$$= 165 \text{ cm}^2$$

Therefore, the curved surface area of the cone is 165 cm^2

Question 2.

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

Solution.

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

$$\text{Slant height (l)} = 21 \text{ m}$$

$$\text{TSA of cone} = \pi r(r + l)$$

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

$$= \frac{22}{7} * 12 * 33$$

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

Question 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

Solution.

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

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

CSA of cone = $\pi r l$

$$308 \text{ cm}^2 = \frac{22}{7} * r * 14$$

$$r = \frac{308}{44}$$

$$= 7 \text{ cm}$$

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

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

$$= [308 + \frac{22}{7} * (7)^2] \text{ cm}^2$$

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

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

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

Question 4.

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

(i) Slant height of the tent.

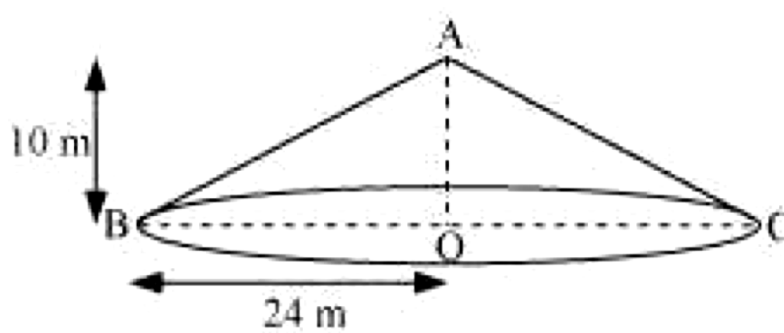
(ii) Cost of the canvas required to make the tent, if the cost of 1 m^2 canvas is Rs 70

Solution.

(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 $\triangle ABO$,

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

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

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

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

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

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

$$= \frac{22}{7} * 24 * 26$$

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

Cost of 1 m^2 canvas = Rs 70

$$\text{So, cost of } \frac{13728}{7} \text{ m}^2 \text{ canvas} = \left(\frac{13728}{7} \text{ m}^2 * 70 \right)$$

$$= \text{Rs } 137280$$

Question 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 $\pi = 3.14$)

Solution.

$$\text{Height (h)} = 8\text{m}$$

$$\text{Radius (r)} = 6\text{m}$$

$$\text{Slant height (l)} = (\sqrt{6} * \sqrt{6} + \sqrt{8} * \sqrt{8}) \text{ m}$$

$$= \sqrt{100} \text{ m}$$

$$= 10 \text{ m}$$

$$\text{CSA of conical tent} = \pi r l$$

$$= (3.14 * 6 * 10)$$

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

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

$$\text{Area of sheet} = \text{CSA of tent [(l – 0.2 m) \times 3] m}$$

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

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

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

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

Question 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

Solution.

Slant height (l) of conical tomb = 25 m

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

$$= 7 \text{ m}$$

$$\text{CSA of conical tomb} = \pi r l$$

$$= \frac{22}{7} * 7 * 25$$

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

Cost of white-washing 100 m^2 area = Rs 210

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

$$= \text{Rs } 1155$$

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

Question 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

Solution.

$$\text{Radius } (r) = 7 \text{ cm}$$

$$\text{Height } (h) = 24 \text{ cm}$$

$$\text{Slant height } (l) = \sqrt{7^2 + 24^2}$$

$$= \sqrt{625}$$

$$= 25 \text{ m}$$

$$\text{CSA (1 conical cap)} = \pi r l$$

$$= \left(\frac{22}{7} \times 7 \times 25 \right)$$

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

$$\text{CSA of 10 conical caps} = (10 \times 550)$$

$$= 5500 \text{ cm}^2$$

Question 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 $\sqrt{1.04} = 1.02$)

Solution.

$$\text{Radius (r)} = \frac{40}{2} = 20 \text{ cm}$$

$$= 0.2 \text{ m}$$

$$\text{Height (h)} = 1 \text{ m}$$

$$\text{Slant height (l)} = \sqrt{1 * 1 + 0.2 * 0.2}$$

$$= \sqrt{1.04}$$

$$= 1.02 \text{ m}$$

$$\text{Curved Surface Area} = \pi r l$$

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

$$= 0.64056 \text{ m}^2$$

$$\text{CSA (50 cones)} = 0.64056 * 50$$

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

$$\text{Cost of painting 1 m}^2 \text{ area} = \text{Rs } 12$$

$$\text{Cost of painting 32.028 m}^2 \text{ area} = \text{Rs } (32.028 \times 12)$$

$$= \text{Rs } 384.336$$

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

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