EXERCISE 13.3 PAGE NO: 221

1. Diameter of the base of a cone is 10.5 cm, and its slant height is 10 cm. Find its curved surface area. (Assume π=22/7)

Solution:

Radius of the base of cone = diameter/ 2 = (10.5/2)cm = 5.25cm

The slant height of the cone, say l = 10 cm

CSA of the cone is = πrl

= (22/7)×5.25×10 = 165 cm^2

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

2. Find the total surface area of a cone, if its slant height is 21 m and the diameter of its base is 24 m. (Assume π = 22/7)

Solution:

Radius of cone, r = 24/2 m = 12m

Slant height, l = 21 m

Formula: Total Surface area of the cone = πr(l+r)

Total Surface area of the cone = (22/7)×12×(21+12) m^2

= 1244.57m^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.

(Assume π = 22/7)

Solution:

The slant height of the cone, l = 14 cm

Let the radius of the cone be r.

(i) We know the CSA of cone = πrl

Given: Curved surface area of a cone is 308 cm^2

(308) = (22/7)×r×14

308 = 44 r

r = 308/44 = 7 cm

The radius of a cone base is 7 cm.

(ii) Total surface area of cone = CSA of cone + Area of base (πr^2)

Total surface area of cone = $308+(22/7)\times7^2 = 308+154 = 462$ cm^2

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

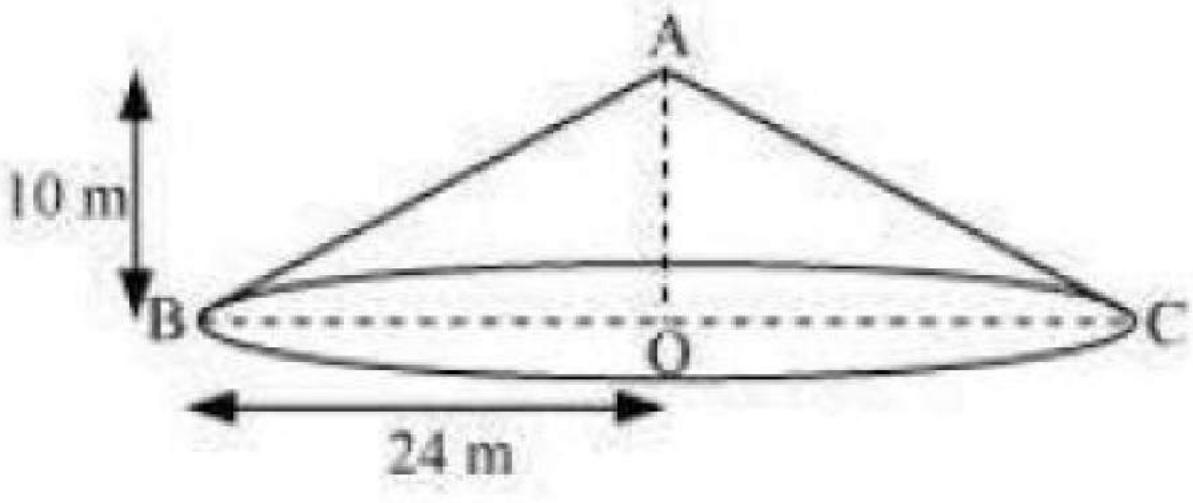
4. A conical tent is 10 m high, and the radius of its base is 24 m. Find

(i) slant height of the tent.

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

(Assume π=22/7)

Solution:



Let ABC be a conical tent.

Height of conical tent, h = 10 m

Radius of conical tent, r = 24m

Let the slant height of the tent be l.

(i) In the right triangle ABO, we have

$AB^2 = AO^2+BO^2$(using Pythagoras' theorem)

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

$= (10)^2+(24)^2$

$= 676$

$l = 26$ m

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

(ii) CSA of tent = πrl

$= (22/7)\times24\times26$ m^2

Cost of 1 m^2 canvas = Rs 70

Cost of (13728/7)m^2 canvas is equal to Rs $(13728/7)\times70$ = Rs 137280

Therefore, the cost of the canvas required to make such a tent is Rs 137280.

5. What length of tarpaulin 3 m wide will be required to make a conical tent of height 8 m and base radius 6m? 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]

Solution:

Height of the conical tent, h = 8m

Radius of the base of the tent, r = 6m

Slant height of the tent, $l^2 = (r^2+h^2)$

$l^2 = (6^2+8^2) = (36+64) = (100)$

or l = 10 m

Again, CSA of conical tent = πrl

$= (3.14\times6\times10)$ m^2

$= 188.4$m^2

Let the length of the tarpaulin sheet required be L.

As 20 cm will be wasted,

The effective length will be (L-0.2m).

The breadth of tarpaulin = 3m (given)

Area of sheet = CSA of the tent

$[(L–0.2)\times3] = 188.4$
$L-0.2 = 62.8$

L = 63 m

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

6. The slant height and base diameter of the conical tomb are 25m and 14 m, respectively. Find the cost of whitewashing its curved surface at the rate of Rs. 210 per 100 m^2. (Assume $\pi = 22/7$)

Solution:

Slant height of the conical tomb, l = 25m

Base radius, r = diameter/2 = 14/2 m = 7m

CSA of the conical tomb = πrl

= $(22/7)\times7\times25 = 550$

CSA of the conical tomb= $550m^2$

Cost of whitewashing 550 m^2 area, which is Rs $(210\times550)/100$

= Rs. 1155

Therefore, the cost will be Rs. 1155 while whitewashing the tomb.

7. A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24cm. Find the area of the sheet required to make 10 such caps. (Assume $\pi = 22/7$)

Solution:

Radius of the conical cap, r = 7 cm

Height of the conical cap, h = 24cm

Slant height, $l^2 = (r^2+h^2)$

= (7^2+24^2)

= (49+576)

= (625)

Or l = 25 cm

CSA of 1 conical cap = πrl

= $(22/7)\times7\times25$

= 550 cm^2

CSA of 10 caps = (10×550) cm^2 = 5500 cm^2

Therefore, the area of the sheet required to make 10 such caps is 5500 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 $\sqrt{(1.04)} = 1.02$)

Solution:

Given:

Radius of cone, r = diameter/2 = 40/2 cm = 20cm = 0.2 m

Height of cone, h = 1m

Slant height of cone is l, and $l^2 = (r^2+h^2)$

Using given values, $l^2 = (0.2^2+1^2)$

$= (1.04)$

Or l = 1.02 m

Slant height of the cone is 1.02 m.

Now,

CSA of each cone = πrl

$= (3.14\times0.2\times1.02)$

= 0.64056 m

CSA of 50 such cones = $(50\times0.64056) = 32.028$

CSA of 50 such cones = 32.028 m^2

Again,

Cost of painting 1 m^2 area = Rs 12 (given)

Cost of painting 32.028 m^2 area = Rs (32.028×12)

= Rs.384.336

= Rs.384.34 (approximately)

Therefore, the cost of painting all these cones is Rs. 384.34.