NCERT Solutions for Class 10 Maths Chapter 13 Surface Areas and Volumes Exercise 13.2

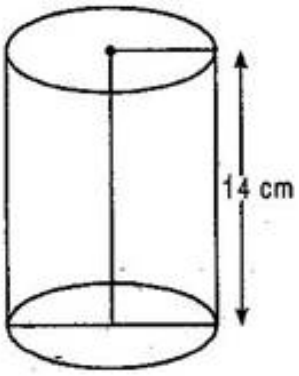
Exercise 13.2

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

1. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of the base of the cylinder.

Ans. Given: Height of cylinder (h) = 14 cm, Curved Surface Area = 88 cm^2

Let radius of base of right circular cylinder = r cm



$2\pi rh = 88$

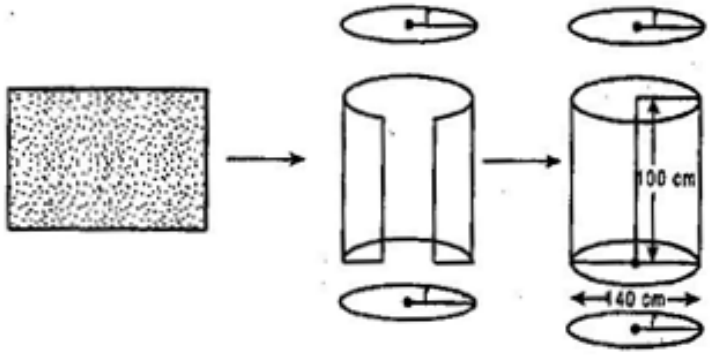
$$\Rightarrow \quad 2 \times \frac{22}{7} \times r \times 14 = 88$$

$$\Rightarrow \quad r = 88 \times \frac{7}{22} \times \frac{1}{14} \times \frac{1}{2}$$

$$\Rightarrow \quad r = 1 \text{ cm}$$

Diameter of the base of the cylinder = $2r$ = 2 x 1 = 2 cm

2. It is required to make a closed cylindrical tank of height 1 m and base diameter 140 cm from a metal sheet. How many square meters of the sheet are required for the same?



Ans. Given: Diameter = 140 cm

$\Rightarrow$ Radius (r) = 70 cm = 0.7 m

Height of the cylinder (h) = 1 m

Total Surface Area of the cylinder

$= 2\pi r(r+h)$

$= 2\times\frac{22}{7}\times 0.7(0.7+1)$

= 2 x 22 x 0.1 x 1.7 = 7.48 m^2

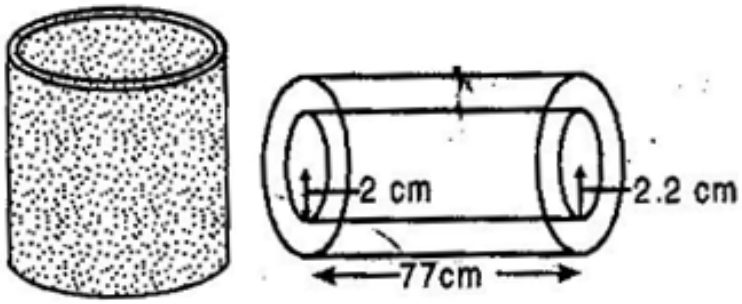
Hence 7.48 m^2 metal sheet is required to make the close cylindrical tank.

3. A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. [See fig.]. Find its:

(i) Inner curved surface area

(ii) Outer curved surface area

(iii) Total surface area



Ans. (i) Length of the pipe = 77 cm, Inner diameter of cross-section = 4 cm

$\Rightarrow$ Inner radius of cross-section = 2 cm

Inner curved surface area of pipe = $2\pi rh$ =

$2\times\frac{22}{7}\times2\times77$

= 2 x 22 x 2 x 11 = 968 cm^2

(ii) Length of pipe = 77 cm, Outer diameter of pipe = 4.4 cm

$\Rightarrow$ Outer radius of the pipe = 2.2 cm

Outer surface area of the pipe = $2\pi rh$

$=2\times\frac{22}{7}\times2.2\times77$

= 44 x 2.2 x 11 = 1064.8 cm^2

(iii) Now there are two circles of radii 2 cm and 2.2 cm at both the ends of the pipe.

$\therefore$ Area of two edges of the pipe = 2 (Area of outer circle – area of inner circle)

$= 2\left(\pi R^2 - \pi r^2\right) = 2\pi\left(R^2 - r^2\right)$

$= 2 \times \frac{22}{7}\left[(2.2)^2 - (2)^2\right] = \frac{44}{7}(4.84 - 4)$

$= \frac{44}{7} \times 0.84 = 5.28 \text{ cm}^2$

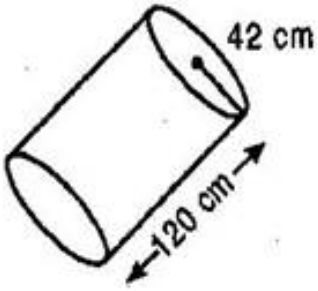
$\therefore$ Total surface area of pipe

= Inner curved surface area + Outer curved surface area + Area of two edges

$= 968 + 1064.8 + 5.28 = 2038.08 \text{ cm}^2$

4. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of the playground in m^2.

Ans. Diameter of roller = 84 cm



$\Rightarrow$ Radius of the roller = 42 cm

Length (Height) of the roller = 120 cm

Curved surface area of the roller = $2\pi rh$

$= 2 \times \frac{22}{7} \times 42 \times 120 = 31680 \text{ cm}^2$

$= 3.1680 \text{ m}^2$

$\because$ Now area leveled by roller in one revolution = 3.1680 m^2

$\therefore$ Area leveled by roller in 500 revolutions

$= 3.1680 \times 500 = 1584.0000 = 1584 \text{ m}^2$

5. A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of white washing the curved surface of the pillar at the rate of Rs. 12.50 per m^2.

Ans. Diameter of pillar = 50 cm

$\Rightarrow$ Radius of pillar = 25 cm = $\frac{25}{100} = \frac{1}{4}$ m

Height of the pillar = 3.5 m

Now, Curved surface area of the pillar

$= 2\pi rh$

$= 2\frac{22}{7} \times \frac{1}{4} \times 3.5 = \frac{11}{2}$ m^2

$\because$ Cost of white washing 1 m^2 = Rs. 12.50

$\therefore$ Cost of white washing $\frac{11}{2}$ m^2

$= 12.50 \text{ x } \frac{11}{2}$ = Rs. 68.75

6. Curved surface area of a right circular cylinder is 4.4 m^2. If the radius of the base of the cylinder is 0.7 m, find its height.

Ans. Curved surface area of the cylinder

= 4.4 m^2, Radius of cylinder = 0.7 m

Let height of the cylinder = h

$\therefore \ 2\pi rh = 4.4$

$\Rightarrow \ 2 \times \frac{22}{7} \times 0.7 \times h = 4.4$

$\Rightarrow \ h = 4.4 \times 7 \times \frac{1}{22} \times \frac{1}{2}$

$\Rightarrow \ h = 1$ m

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