13.2

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.

→ h = 14 cm , Curved surface area = $88 cm^2$

we

Curved Surface area of Cylinder

$= 2\pi rh = 88$

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

$\frac{1}{7}$

$r \times 88 = 88$

$r = \frac{88}{88} = 1$

$r = 1\text{cm}$

diameter $= 2r = 2 \times 1 = 2\text{cm}$

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

⇒ Total Surface area of Cylinder $= 2\pi r(r+h)$

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

$= 2 \frac{44}{7} \times 0.7 \times 1.7$

$= \frac{44}{7} \times \frac{7}{10} \times \frac{17}{10}$

$= \frac{748}{100}$

$= 7.48 \, m^2$

(3) A metal pipe is 77 cm long The inner diameter of a cross section is 4cm, the outer diameter being 4.4cm. Find its
(i) inner curved surface area
(ii) outer curved surface area
(iii) Total surface area.

=> Area of base $= \pi R^2 - \pi r^2$
$= \pi (R^2 - r^2)$

$d = 4cm$
$r = 2cm$
$D = 4.4cm$, $R = 2.2cm$

Area of Base $= \pi(R^2 - r^2)$

$= \frac{22}{7} \times [(2.2)^2 - (2)^2]$

$= \frac{22}{7} \times 4.84$

$= \frac{22}{7_1} \times \frac{0.84^{12}}{100} = \frac{22 \times 12}{100}$

$= 2.64 cm^2$

Inner CSA $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 2 \times 7^{11}$

$= 968 cm^2$

CSA $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 2.2 \times 7$

$= 44 \times 2.2 \times 11$

$= 96.8 \times 11$

TSA = 2 x area of base + Inner + Outer

$= 2 \times 2.64 + 968 + 1064.8$

$= 2038.08 cm^2$

(8) In a hot water heating system, there is a cylindrical petrol storage tank that is 4.2m in diameter and 4.5 m high.

→ $r = \frac{5}{2}$ cm = 2.5cm = 0.025 m

$h = 28$ m

Radiating surface = CSA

CSA of Cylinder = $2\pi rh$

$= 2 \times \frac{22}{7} \times 0.025 \times 28^{4}$

$= 44 \times 0.025 \times 4$

$= 44 \times 0.100$

$= 4.4 m^2$

(9) Find

(i) The lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2m in diameter and 4.5 m high

(ii) How much steel was actually used, if $\frac{1}{2}$ of the steel actually used was wasted in the tank

Sulekha

→ Covers $d = 4.2\ m$, $r = 2.1\ m$
$h = 4.5\ m$

① CSA of cylinder $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 2.1 \times 4.5$

$= \frac{44}{7_1} \times \frac{21^3}{10} \times \frac{45}{10}$

$= \frac{4 \times 3 \times 45}{100}$

$= \frac{5940}{100}$

$= 59.4\ m^2$

Area of Base $= \pi r^2$

$= \frac{22}{7} \times 2.1 \times 2.1$

$= \frac{22}{7_1} \times \frac{21^3}{10} \times \frac{21}{10}$

$= \frac{22 \times 3 \times 21}{100}$

$= \frac{1386}{100} = 13.86$

TSA = CSA + 2 (Area of Base)

= 59.4 + 2 × 13.86

= 59.4 + 27.72

= 87.12 m^2

Let 'x' Sqm is the sheet actually bought

Wastage $= \frac{1}{2} \times x = \frac{x}{12}$

Actual area − wastage = TSA of cylinder

$x - \frac{x}{12} = 87.12$

$\frac{12 - x}{12} = 87.12$

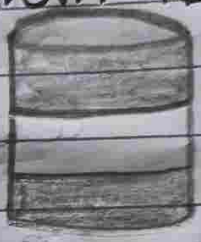
$\frac{11x}{12} = 87.12$

$x = \frac{87.12 \times 12}{11} = \frac{1045.44}{11}$

$x = 95.04\ m^2$

Sulekha

(10) The frame of the lampshade. It is to be be covered with a decorative cloth The frame has a base diameter of 20cm and height of 30cm. A margin of 2.5cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is is required for covering the lampshade



→ Given:- $d = 20cm$ $r = 10$

$h = 30cm + 2.5 + 2.5 = 35cm$

CSA of Cylinder $= 2\pi rh$

$= 2 \times \frac{22}{7_1} \times 10 \times \cancel{35}^{5}$

$= 22 \times 100$

$= 2200\ cm^2$

(11) The Students of a vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of Cylinder with a base using

cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm. The vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required

→ Given:- $r = 3\text{cm}$, $h = 10.5\text{cm}$

CSA of Cylinder $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 3 \times 10.5$

$= \frac{2 \times 22 \times 3 \times 10.5}{7}$

$= \frac{2 \times 22 \times 3 \times \cancel{105}^{15}}{\cancel{7}_{1} \quad 10}$

$= \frac{44 \times 3 \times 15}{10}$

$= \frac{44 \times 45}{10}$

$= \frac{1980}{10}$

$= 198\ \text{cm}^2$

Area of base $= \pi r^2$

$= \frac{22}{7} \times 3 \times 3 = \frac{198}{7} = 28.28...$

Sulekha

Area of one Pen holder = CSA + Area of base

= 198 + 28.28

= 226.28 cm^2

Area of 35 Penholders = 226.28 × 35

= 7919.8

Sheet required is = 7920 cm^2

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

→ Given: d = 84cm $r = \frac{84}{2} = 42cm$

(h) l = 120cm

CSA of the roller = $2\pi rh$

$= 2 \times \frac{22}{7} \times 42 \times 120$

$= 44 \times 6 \times 120$

$= 44 \times 720\ cm^2$

$= 3680\ cm^2$

∴ Area covered by the roller in 1 revolution = 31680 cm^2

∴ Area covered by the roller in 500 revolution = 31680 × 500

= 15840000 cm^2

Area of play ground = $\frac{15840000\ cm^2}{100 \times 100}$

= 1584 m^2 //

(5) A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of ₹ 12.50 per m^2.

→ Given: d = 50 cm r = 25 cm

h = 3.5 m

d = $\frac{50}{100}$ = 0.50 m, r = $\frac{25}{100}$ = 0.25 m

CSA of the pillar = 2πrh

= 2 × $\frac{22}{7}$ × 0.25 × 3.5

$2 \times \frac{22}{7} \times \frac{25}{100} \times \frac{35}{10}$ 5

$= \frac{2 \times 22 \times 25 \times 5}{1000}$

$= \frac{50 \times 110}{1000} = \frac{5500}{1000}$

$= 5.5 m^2$

Cost of painting $1 m^2$ = ₹ 12.50

∴ Total cost of painting the curved surface of the pillar = ₹ 12.50 × 5.5

= ₹ 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.

∴ CSA of the cylinder = $4.4 m^2$

$r = 0.7$ m, $h = ?$

CSA of the cylinder = $2\pi rh$

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

$4.4 = 2 \times \frac{22}{7} \times \frac{7}{10} \times h$

$4.4 = \frac{44}{10} \times h$

$4.4 = 4.4 \times h$

$h = \frac{4.4}{4.4} = 1$

Hence, height of the cylinder is 1m.

(7) The inner diameter of a circular well is 3.5m. It is 10m deep. Find:-

(i) It's inner curved surface area

= Inner curved surface area of the well $= 2\pi rh = 2 \times \frac{22}{7} \times \frac{3.5}{2} \times 10$

$= \frac{2 \times 11}{7} \times 3.5 \times 10$

$= 2 \times \frac{11}{7} \times \frac{35}{10} \times 10$

$= 22 \times 5\ m^2$

$= 110\ m^2$

Sulekha

(ii) The cost of plastering this curved surface at the rate of ₹40 per m²

= cost of plastering 1m² = ₹40

∴ Cost of plastering the curved surface area of the well

= ₹ 110 × 40 = Rs 4400