Surface Area and volume of A Right Circular cylinder 19.1

1.

Sol:

Given that

Radius of base of the cylinder $e_r = 0 \cdot 7m$

Curved surface area of cylinder $= 4 \cdot 4m^2 = 2\pi rh$

Let be the height of the cylinder

WKT,

$2\pi rh = 4 \cdot 4m^2$

$2 \times 3 \cdot 14 \times 0 \cdot 7 \times h = 4 \cdot 4$

$(4 \cdot 4)hm - 4 \cdot 4m^2$

$h = 1m$

$\therefore$ The height of the cylinder $= 1m.$

2.

Sol:

Given that

Height of cylinder = length of cylindrical pipe $= 28m.$

Radius (r) of circular end of pipe $= \frac{9}{2}cm = 2 \cdot 5cm$

$= 0 \cdot 025m.$

Curved surface area of cylindrical pipe $= 2\pi rh$

$= 2 \times 3 \cdot 14 \times 0 \cdot 025 \times 28 = 4 \cdot 4cm$

$\therefore$ The area of radiation surface of the system is $4 \cdot 4m^2$ or $44000cm^2$

3.

Sol:

Given that

Height of the pillar $= 3 \cdot 5m$

Radius of the circular end of the pillar $= \frac{50}{2}cm.$

$= 25cm = 0 \cdot 25m$

Curved surface area of pillar $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 0 \cdot 25 \times 3 \cdot 5m^2$

$= 5 \cdot 5m^2$

Cost of painting $1m^2$ area – $Rs\ 12 \cdot 50$

Cost of painting $S \cdot 5m^2$ area $= Rs(5 \cdot 5 \times 12 \cdot 50)$

$= Rs\ 68 \cdot 75.$

Thus, the cost of painting the CSA pillar is $Rs\ 68,75$

4.

Sol:

Height of the cylindrical tank $(h) = 1m.$

Base radius of cylindrical tank $(r) = \frac{140}{2} m = 70cm$

$= 0 \cdot 7m$

Area of sheet required – total surface area of tank $= 2\pi(r\ th)$

$= 2 \times 3 \cdot 14 \times 0 \cdot 7(0 \cdot 7 + 1) m^2$

$= 4 \cdot 4 \times 1 \cdot 7m^2$

$= 7 \cdot 48m^2$

$\therefore$ So, it will required $7 \cdot 48m^2$ of metal sheet.

5.

Sol:

We have

Curved surface area $= \frac{1}{3} \times$ total surface area

$\Rightarrow 2\pi rh = \frac{1}{3}(2\pi rh + 2\pi r^2)$

$\Rightarrow 6\pi rh = 2\pi rh + 2\pi r^2$

$\Rightarrow 4\pi rh = 2\pi r^2$

$\Rightarrow 2h = r$

We know that,

Total surface area $= 462$

$\Rightarrow$ Curved surface Area $= \frac{1}{3} \times 462$

$\Rightarrow 2\pi rh = 154$

$\Rightarrow 2 \times 3 \cdot 14 \times 2h^2 = 154$

$\Rightarrow h^2 = \frac{154 \times 7}{2 \times 22 \times 2}$

$= \frac{49}{4}$

$\Rightarrow h = \frac{7}{2} cm$

$\Rightarrow r = 2h$

$\Rightarrow r = 2 \times \frac{7}{2} cm$

$\Rightarrow r = 7cm.$

6.

Sol:

Let the inner radii of hollow cylinder $\Rightarrow rcm$

Outer radii of hollow cylinder $\Rightarrow Rcm$

Then,

$\Rightarrow 2\pi h(R+r) + 2(\pi R^2 - \pi r^2) = 4620 \text{ and } \pi R^2 - m^2 = 115 \cdot 5$

$\Rightarrow 2\pi h(R+r) + 231 = 4620 \text{ and } \pi(R^2 - r^2) = 115 \cdot 5$

$\Rightarrow 2\pi \times 7(r+R) = 4389 \text{ and } \pi(R^2 - r^2) = 115 \cdot 5$

$\Rightarrow \pi(R+r) = 313 \cdot 5 \text{ and } \pi(R+r)(R-r) = 115 \cdot 5$

$\Rightarrow \frac{\pi(R+r)(R-r)}{\pi(R+r)} = \frac{115 \cdot 5}{313 \cdot 5}$

$\Rightarrow R - r = \frac{7}{19} cm.$

7.

Sol:

For cylinder, total surface Area $= 2\pi r(h+r)$

Curved surface area $= 2\pi rh$

$\therefore \frac{Total\ surface\ area}{curved\ surface\ area} = \frac{7 \cdot 5 + 3 \cdot 5}{7 \cdot 5} = \frac{11}{7 \cdot 5}$

$= \frac{11 \times 10}{7 \cdot 5} = \frac{22}{15} = 22:15.$

8.

Sol:

Given that,

External radius $(R) = 8cm$

Height $(h) = 10cm$

The total surface area of a hollow metal cylinder $= 338\ IT\ cm^2$

We know that

$2\pi Rh + 2\pi rh + 2\pi R^2 - 2\pi r^2 = 338\pi.$

$\Rightarrow h(R+r) + (R+r)(R-r) = 169$

$\Rightarrow 10(8+r) + (8+r)(8-r) = 169$

$\Rightarrow 80 + 10r + 6\cdot 4 - x^2 = 169$

$\Rightarrow x^2 - 10r + 25 = 0$

$\Rightarrow r = 5$

$\therefore R - r = 8 - 5cm = 3cm$

9.

Sol:

Given that

$r = 70cm,\ h = 1\cdot 4m = 140cm$

$\therefore$ Area to be tin coated $= 2\left(2\pi rh + \pi r^2\right) = 2\pi r(2h + r)$

$= 2 \times \frac{22}{7} \times 70(280 + 70)$

$= 154000\,cm^2$

Required cost $= \frac{154000 \times 3\cdot 50}{1000} = Rs\,539.$

10.

Sol:

Inner radius (r) of circular well $= 1\cdot 75m$

Depth (n) of circular well $= 10m$

(i) Inner curved surface area $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 1\cdot 75 \times 10m^2$

$= 144 \times 0\cdot 25 \times 10)\,m^2$

$= 110m^2$

(ii) Cost of plastering $1m^2$ area $= Rs\ 40.$

Cost of plastering $110m^2$ $area = Rs(110 \times 40)$

$= Rs\ 4400$

11.

Sol:

Height (h) cylindrical tank $= 4 \cdot 5m$

Radius (r) of circular end of cylindrical tank $= \frac{4 \cdot 2}{2} m = 2 \cdot 1m.$

(i) Lateral or curved surface area of tank $= 2\pi rh$

$\Rightarrow 2 \times 3 \cdot 14 \times 2 \cdot 1 \times 4 \cdot 5m^2$

$= 59 \cdot 4m^2$

(ii) Total surface area of tank $= 2\pi r(r+h)$

$= 2\left[\frac{22}{7}\right] \times 2 \cdot 1(2 \cdot 1 + 4 \cdot 5) m^2$

$= 87 \cdot 12m^2$

Let $A\ m^2$ steel sheet be actually used in making the tank

$\therefore A\left(1 - \frac{1}{12}\right) = 87 \cdot 12m^2$

$\Rightarrow A = \left(\frac{12}{\pi} \times 87 \cdot 12\right) m^2$

$\Rightarrow A = 95 \cdot 04m^2$

Thus, $95 \cdot 04\ m^2$ steel was used in actual while making the tank.

12.

Sol:

Radius of circular end of cylinder pen holder $= 3cm$

Height of pen holder $= 10 \cdot 5cm$

Surface area of 1 pin holder = CSA of penholder + Area of base of SA of 1 penholder = $2\pi rh + \pi r^2$

$= 2 \times 3 \cdot 14 \times 3 \times 10 \cdot 5 + 3 \cdot 14138$

$= 132 \times 1 \cdot 5 + \frac{198}{7} cm^2$

$= 198 + \frac{198}{7} cm^2$

$= \frac{1584}{7} cm^2$

Area of car board sheet used by 1 competitor $= \frac{1584}{7} cm^2$

Area of car board sheet used by 35 competitors $= \frac{1584}{7} \times 35cm^2 = 7920cm^2.$

13.

Sol:

Given that,

Diameter of the roller $= 84cm = 0 \cdot 84m.$

Length of the roller $= 1 \cdot 5m.$

Radius of the roller $= \frac{D}{2} = \frac{0 \cdot 84}{2} = 0 \cdot 42.$

Area covered by the roller on one revolution = covered surface area of roller

Curved surface of roller $= 2\pi rh = 2 \times \frac{22}{7} \times 0 \cdot 42 \times 1 \cdot 5$

$= 0 \cdot 12 \times 22 \times 1 \cdot 5m^2$

Area of the playground $= 100 \times$ Area covered by roller in one revolution

$= \left(100 \times 0 \cdot 12 \times 22 \times 1 \cdot 5\right) m^2$

$= 396m^2$

Now,

Cost of leveling $1m^2 = 50P = \frac{50}{100} \Rightarrow \text{Re} = \frac{1}{2} rs$

Cost of leveling $396m^2 = \frac{1}{2} \times 396 = Rs \cdot 198$

Hence, cost of leveling $396m^2$ is 198

14.

Sol:

Diameter of each pillar $= 0 \cdot 5m$

Radius of each pillar $\left(r\right) \frac{a}{2} = \frac{0 \cdot 5}{2} = 0 \cdot 25m.$

Height of each pillar $= 4m.$

Curved surface area of each pillar $= 2\pi rh$

$= 2 \times 3 \cdot 14 \times 0 \cdot 25 \times 4m^2$

$= \frac{44}{7} m^2$

Curved surface area of 20 pillars $= 20 \times \frac{44}{7} m^2$

Given, cost of cleaning $= Rs\, 2 \cdot 50\, per$ square meter

$\therefore$ Cost of cleaning 20 pillars $= Rs\ 2 \cdot 50 \times 20 \times \frac{44}{7}$

$= Rs\ 314 \cdot 28.$