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 $= Rs\left(5\cdot 5\times 12\cdot 50\right)$

$= Rs\ 68\cdot 75.$

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

4.

Sol:

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

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

$=0\cdot 7m$

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

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

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

$=7\cdot 48m^2$

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

5.

Sol:

We have

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

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

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

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

$\Rightarrow 2h=r$

We know that,

Total surface area $=462$

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

$\Rightarrow 2\pi rh=154$

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

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

$=\dfrac{49}{4}$

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

$\Rightarrow r = 2h$

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

$\Rightarrow r = 7cm.$

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 $= 2\pi rh$

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

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

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 $= \dfrac{154000 \times 3 \cdot 50}{1000} = Rs\,539.$

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 $= \dfrac{4\cdot 2}{2}m = 2\cdot 1m.$

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

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

$= 87\cdot 12m^2$

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

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

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

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

Thus, $95\cdot 04m^2$ 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 = $2\pi rh + \pi r^2$

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

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

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

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

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

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

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

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

$= 396m^2$

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 $(r)\frac{a}{2} = \frac{0\cdot 5}{2} = 0\cdot 25m.$

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 $= Rs\ 2\cdot 50\times 20\times\frac{44}{7}$

$= Rs\ 314\cdot 28.$