

## Chapter - 13

### Surface Area and Volume

#### Notes

Name of Solid	C.S.A / L.S.A	T.S.A
Cube	$4a^2$ Sq. units	$6a^2$ Sq. units
Cuboid	$2(l+b) \times h$	$2(lb + bh + hl)$
Cylinder	$2\pi rh$	$2\pi r(h+r)$
Cone	$\pi rl$ $l = \sqrt{r^2 + h^2}$ $l \rightarrow$ Slant height	$\pi r(l+r)$

Cone	$\pi r l$ $l = \sqrt{r^2 + h^2}$ $l \rightarrow$ Slant height	$\pi r r (l + r)$
Sphere	-	$4\pi r^2$
Hemisphere	$2\pi r^2$	$3\pi r^2$
Hollow Cylinder	$2\pi (R+r)h$	$2\pi (R+r)(h+R-r)$ $(or)$ $2\pi [Rh + rh + (R^2 - r^2)]$

Diagonal of a cube =  $\sqrt{3}a$  units

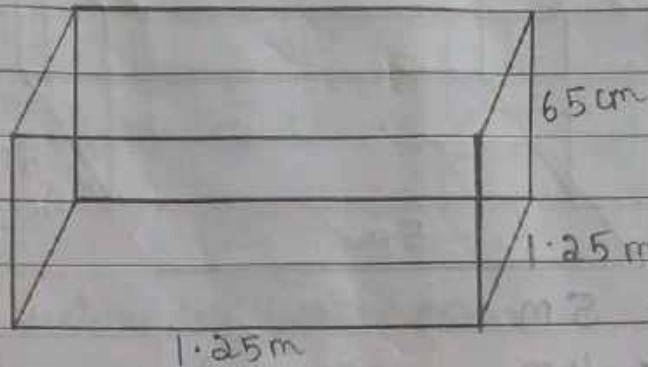
Length of 12 edges of cube =  $12a$

Diagonal of a cuboid =  $\sqrt{l^2 + b^2 + h^2}$  units

Length of 12 edges of cuboid =  $4(l+b+h)$

Ex: 13.1

1. Refer text book pg: 213



5.5750

given:

$$l = 1.5 \text{ m}$$

$$b = 1.25 \text{ m}$$

$$h = 65 \text{ cm}$$

$$= 0.65 \text{ m}$$

$$\begin{aligned} \text{i) Area of Sheet Required} &= \text{C.S.A of a cuboid} + \text{area of rectangular base} \\ &= 2(l+b)h + lb \\ &= (2 \times (1.5 + 1.25) \times 0.65) + (1.5 \times 1.25) \\ &= (1.30 \times 2.75) + 1.875 \\ &= 3.5750 \text{ m}^2 + 1.875 \\ &= 5.45 \text{ m}^2 \end{aligned}$$

$$\text{ii) Rate of Sheet per m}^2 = ₹ 20$$

$$\begin{aligned} \text{Rate of Sheet for } 5.45 \text{ m}^2 &= 5.45 \times 20 \\ &= ₹ 109 \end{aligned}$$

$$\text{Ans} \Rightarrow \text{i) } 5.45 \text{ m}^2$$

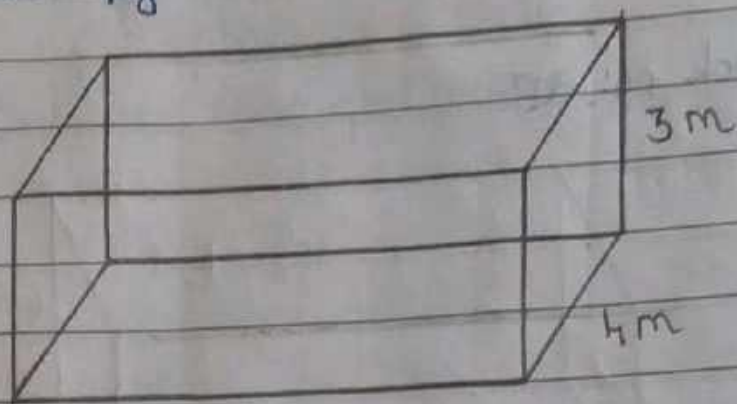
$$\text{ii) } ₹ 109$$



$$\begin{array}{r} 125 \\ 15 \\ \hline 625 \\ 125 \\ \hline 1875 \\ \hline 000 \end{array}$$



2. Refer text book pg : 213



given:

$$l = 5\text{ m}$$

$$b = 4\text{ m}$$

$$h = 3\text{ m}$$

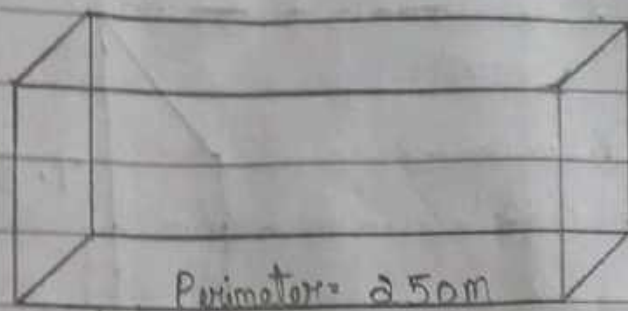
$$\begin{aligned}\text{Total area to be whitewashed} &= \text{area of 4 walls} + \text{area of ceiling} \\ &= (\text{C.S.A of cuboid}) + \text{area of rectangle} \\ &= (2(l+b)h) + l \times b \\ &= (2(5+4)3) + (5 \times 4) \\ &= (6 \times 9) + 20 \\ &= 54 + 20 \\ \text{Area} &= 74\text{ m}^2\end{aligned}$$

$$\text{Cost of white washing per m}^2 = ₹ 7.50$$

$$\begin{aligned}\text{Cost of white washing } 74\text{ m}^2 &= ₹ 7.50 \times 74 \\ &= ₹ 555\end{aligned}$$

Ans = ₹ 555	✓
-------------	---

3. Reflex text book pg: 213



given:

Perimeter of rectangular floor = 250m

Cost of painting per  $m^2$  = ₹ 10

Cost of painting 4 walls = ₹ 15000

Perimeter of 4 walls = 250m

$$\Rightarrow 2(l+b) = 250m$$

$\therefore$  Cost of painting 4 walls = ₹ 15000,

Cost of painting per  $m^2$  = ₹ 10

$$\therefore \text{Area of 4 walls} = \frac{15000}{10}$$

$$= 1500m^2$$

$$\Rightarrow 2(l+b)h = 1500m^2$$

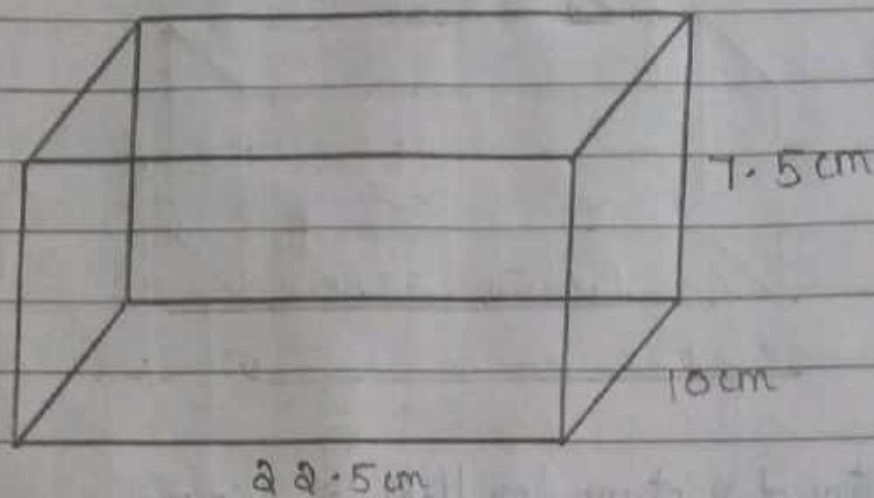
$$\Rightarrow 250 \times h = 1500$$

$$\Rightarrow h = \frac{1500}{250}$$

$$h = 6m$$

Ans =  $h = 6m$  ✓

4. Refer text book pg: 2103



Soln:

$$l = 22.5 \text{ cm}$$

$$b = 10 \text{ cm}$$

$$h = 7.5 \text{ cm}$$

$$\begin{aligned} \text{T.S.A of a brick} &= 2(lb + bh + hl) \\ &= 2((22.5 \times 10) + (10 \times 7.5) + (22.5 \times 7.5)) \\ &= 2(225 + 75 + 168.75) \\ &= 2(468.75) \\ &= 937.5 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Sufficient paint available} &= 9.375 \text{ m}^2 \\ &= 93750 \text{ cm}^2 \end{aligned}$$

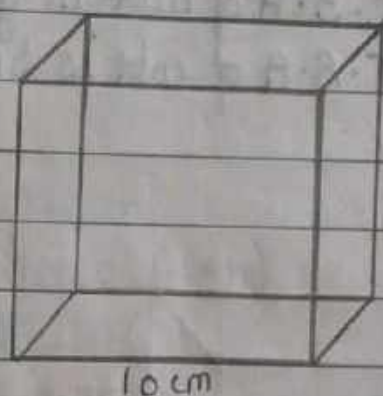
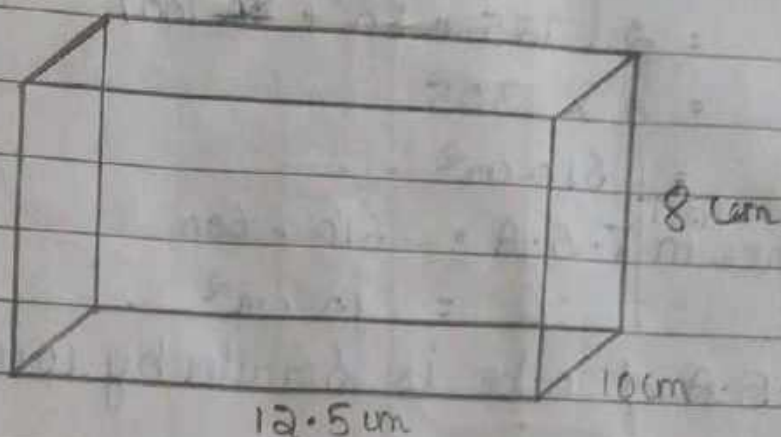
$$\begin{aligned} \text{No. of bricks can be painted} &= 93750 \div 937.5 = \frac{937500}{9375} \\ &= 100 \end{aligned}$$

Ans = 100 bricks.





5. Refer text book pg: 213



Soln:

i) Edge of a cube = 10 cm

$$\begin{aligned}\text{L.S.A of a cube} &= 4a^2 \\ &= 4 \times (10)^2 \\ &= 4 \times 100 \\ &= 400 \text{ cm}^2\end{aligned}$$

In a cuboid,

$$l = 12.5 \text{ cm}, b = 10 \text{ cm}, h = 8 \text{ cm}$$

$$\begin{aligned}\text{L.S.A of a cuboid} &= 2(l+b)h \\ &= 2 \times (12.5 + 10) \times 8 \\ &= 2 \times 22.5 \times 8 \\ &= 360 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Difference in L.S.As} &= 400 - 360 \text{ cm}^2 \\ &= 40 \text{ cm}^2\end{aligned}$$

$\therefore$  L.S.A of a cube is greater by  $40 \text{ cm}^2$

ii) ~~Q. 1~~ T.S.A of a cube =  $6a^2$   
=  $6 \times (10)^2$   
=  $6 \times 100$   
=  $600 \text{ cm}^2$

T.S.A of a cuboid =  $2(lb + bh + hl)$



PAGE: \_\_\_\_\_  
DATE: \_\_\_\_\_

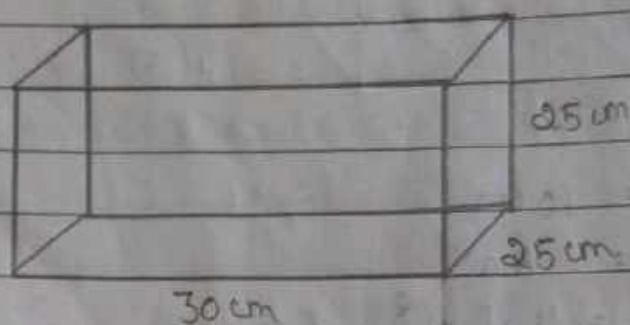
$$\begin{aligned}
 &= 2((12.5 \times 10) + (10 \times 8) + (12.5 \times 8)) \\
 &= 2(125 + 80 + 100) \\
 &= 2 \times 305 \\
 &= 610 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Difference in T.S.A} &= 610 - 600 \\
 &= 10 \text{ cm}^2
 \end{aligned}$$

$\therefore$  T.S.A of cube is smaller by  $10 \text{ cm}^2$

Ans  $\Rightarrow$  i) C.S.A of cube is greater by  $40 \text{ cm}^2$   
 ii) T.S.A of cube is smaller by  $10 \text{ cm}^2$

6. Refer text book pg: 213



Soln:

$$l = 30 \text{ cm}$$

$$b = 25 \text{ cm}$$

$$h = 25 \text{ cm}$$

$$\begin{aligned} \text{i) Area of the glass} &\Rightarrow \text{T.S.A of a cuboid} = 2(lb + bh + hl) \\ &= 2(30 \times 25) + (25 \times 25) + (25 \times 30) \\ &= 2(750 + 625 + 750) \\ &= 2 \times 2125 \\ &= 4250 \text{ cm}^2 \end{aligned}$$

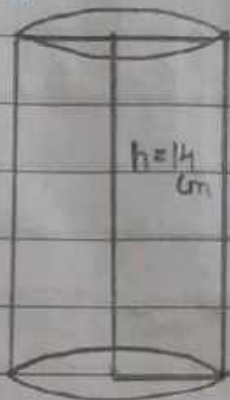
$$\begin{aligned} \text{ii) Tape needed for 12 edges} &= 4(l + b + h) \\ &= 4(30 + 25 + 25) \\ &= 4 \times 80 \\ &= 320 \text{ cm} \end{aligned}$$

$$\text{Ans} = \text{i) } 4250 \text{ cm}^2$$

$$\text{ii) } 320 \text{ cm}^2$$

Ex: 13.2

1. Refer text book pg: 216



$$C.S.A = 88\text{cm}^2$$

Soln:

given:

$$h = 14\text{ cm}$$

$$\text{Curved Surface Area} = 88\text{cm}^2$$

$$2\pi rh = 88\text{cm}^2$$

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

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

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

$$\therefore \text{Diameter, } d = 2 \times r$$

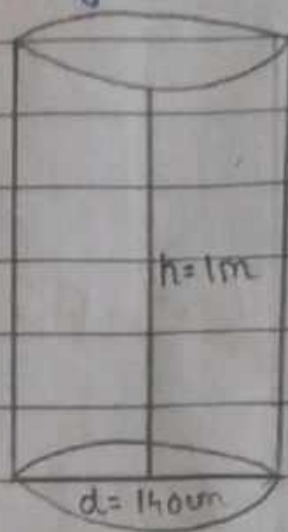
$$= 2\text{ cm}$$

$$\text{Ans} = 2\text{ cm}$$





2. Refer text book pg: 216



Soln:

given:

$$d = 140cm$$

$$r = \frac{140}{2}$$

$$r = 70cm$$

$$r = 0.7m$$

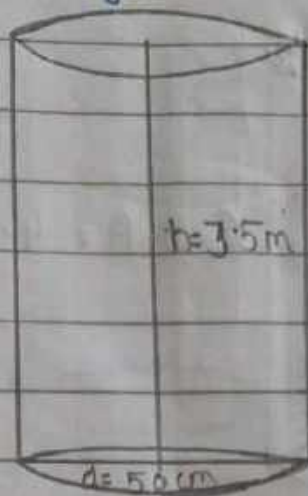
$$h = 1m$$

$$\begin{aligned} T.S.A \text{ of a cylindrical tank} &= 2\pi r(h+r) \\ &= 2 \times \frac{22}{7} \times 0.7 (1+0.7) \\ &= 4.4 \times 1.7 \\ &= 7.48m^2 \end{aligned}$$

$$\boxed{\text{Ans} = 7.48m^2}$$



5. Refer text book pg: 217



Soln:

given:

$$d = 50 \text{ cm}$$

$$r = \frac{50}{2}$$

$$r = 25 \text{ cm}$$

$$r = 0.25 \text{ m}$$

$$h = 3.5 \text{ m}$$

$$\text{C.S.A of a cylindrical pillar} = 2\pi rh$$

$$= 2 \times \frac{22}{7} \times 0.25 \times 3.5$$

$$= 5.5 \times 1$$

$$= 5.5 \text{ m}^2$$

$$\text{Cost of painting C.S.A of a pillar per m}^2 = ₹ 12.50$$

$$\begin{aligned} \text{Cost of painting C.S.A of a pillar for } 5.5 \text{ m}^2 &= ₹ 12.50 \times 5.5 \\ &= ₹ 68.750 \end{aligned}$$

$$\text{Ans} = ₹ 68.75$$



6. Refer text book pg: 217



$$C.S.A = 4.4 \text{ m}^2$$

Soln:

given:

$$h = 0.7 \text{ m}$$

$$C.S.A \text{ of a right circular cylinder} = 4.4 \text{ m}^2$$
$$2\pi r h = 4.4 \text{ m}^2$$

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

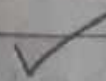
$$\Rightarrow h = \frac{4.4}{44 \times 0.1}$$

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

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

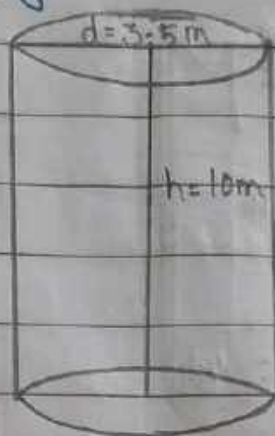
$$h = 1 \text{ m}$$

$$\text{Ans} \Rightarrow h = 1 \text{ m}$$





7. Refer text book pg: 217



Soln:

given:

$$\text{Inner diameter} = 3.5 \text{ m}$$

$$\text{Inner Radius, } r = \frac{3.5 \text{ m}}{2}$$

$$h = 10 \text{ m}$$

$$\begin{aligned} \text{i) Inner curved surface area} &= 2\pi rh \\ &= 2 \times \frac{22}{7} \times \frac{3.5}{2} \times 10 \\ &= 22 \times 5 \\ &= 110 \text{ m}^2 \end{aligned}$$

$$\text{ii) Cost of plastering per m}^2 = ₹ 40$$

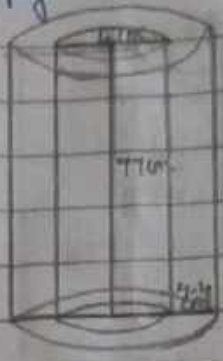
$$\begin{aligned} \text{Cost of plastering } 110 \text{ m}^2 &= ₹ 40 \times 110 \text{ m}^2 \\ &= ₹ 4400 \end{aligned}$$

Ans: i)  $110 \text{ m}^2$

ii) ₹ 4400



3. Refer text book pg: 216



Soln:   
 given:

i) C.S.A of inner cylinder:

$$d = 4 \text{ cm}$$

$$\therefore r = 2 \text{ cm}$$

$$h = 77 \text{ cm}$$

$$\begin{aligned} \text{C.S.A of a cylinder} &= 2\pi rh \\ &= 2 \times 22 \times 2 \times 77 \\ &= 968 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{r} 11 \\ 77 \\ \hline 88 \\ 154 \\ \hline 1852 \\ 1852 \\ \hline 2038.08 \end{array}$$

$$\begin{array}{r} 44 \\ 22 \\ \hline 88 \\ 88 \\ \hline 968 \end{array}$$

ii) C.S.A of outer cylinder:

$$D = 4.4 \text{ cm}$$

$$R = 2.2 \text{ cm}$$

$$h = 77 \text{ cm}$$

$$\begin{aligned} \text{C.S.A of a cylinder} &= 2\pi Rh \\ &= 2 \times 22 \times 2.2 \times 77 \\ &= 1064.8 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{r} 11 \\ 22 \\ \hline 22 \\ 44 \\ \hline 44 \\ 88 \\ \hline 968 \\ 968 \\ \hline 1064.8 \end{array}$$

iii) T.S.A of hollow cylinder =  $2\pi(h+R)(h+R-h)$

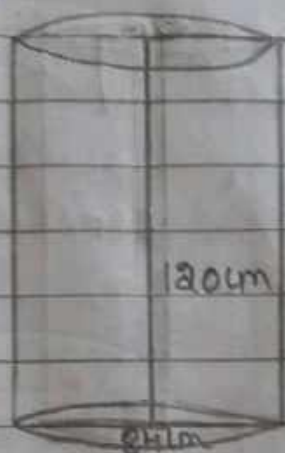
$$\begin{aligned} &= 2 \times 22 \times (2.2 + 2.2) \times (77 + 2.2 - 2.2) \\ &= \frac{44}{1} \times 4.4 \times (77 - 0) \\ &= \frac{44}{1} \times 4.4 \times 77 \end{aligned}$$

$$= 2038.08 \text{ cm}^2$$

Ans: i)  $968 \text{ cm}^2$ , ii)  $1064.8 \text{ cm}^2$ , iii)  $2038.08 \text{ cm}^2$



4. Refer text book pg: 217



Soln:

given:

$$d = 84 \text{ cm}$$

$$r = 42 \text{ cm}$$

$$h = 120 \text{ cm}$$

$$\text{C.S.A of a cylindrical roller} = 2\pi rh$$

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

$$\begin{array}{r} 1440 \\ 22 \\ \textcircled{1} 2880 \\ 2880 \\ \hline 31680 \end{array}$$

$$\text{Area levelled in 1 revolution} = 31680 \text{ cm}^2$$

$$\text{No. of rounds to complete a playground} = 500$$

$$\text{Area of a playground} = 500 \times 31680$$

$$= 15840000 \text{ cm}^2$$

$$= 15840000$$

$$10000$$

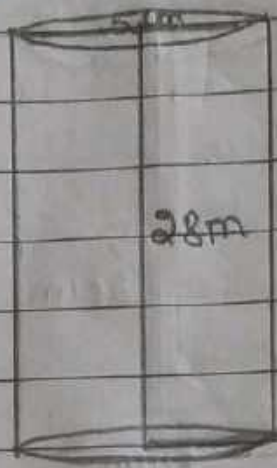
$$= 1584 \text{ m}^2$$

$$\begin{array}{r} 120 \\ 12 \\ 240 \\ 120 \\ \hline 1440 \\ \textcircled{5} \textcircled{4} \\ 31680 \\ 5 \\ \hline 158400 \end{array}$$

$$\text{Ans} = 1584 \text{ m}^2$$



8. Refer text book pg: 217



Soln:

$$h = 28\text{m}$$

$$h = 2800\text{cm}$$

$$d = 5\text{cm}$$

$$r = \frac{5}{2}\text{cm}$$

Radiating Surface = Outer C.S.A of a cylindrical pipe

$$= 2\pi rh$$

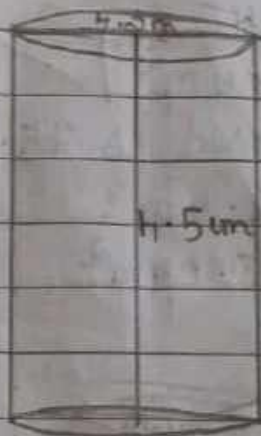
$$= 2 \times \frac{5}{2} \times 2800$$

$$= 1100 \times 400$$

$$= 44000\text{ cm}^2$$

Ans = $44000\text{ cm}^2$ (or) $4.4\text{ m}^2$	✓
--	---

9. Refer text book pg: 217



Soln:

given:

i) C.S.A of a cylindrical petrol tank:

$$d = 4.2\text{m}$$

$$r = 2.1\text{m}$$

$$h = 4.5\text{m}$$

$$\text{C.S.A of a cylindrical tank} = 2\pi rh$$

$$= 2 \times \frac{4.2}{2} \times \frac{4.2}{2} \times 4.5$$

$$= 44 \times 1.35$$

$$= 59.40\text{ m}^2$$

$$\boxed{= 59.4\text{ m}^2} \quad \checkmark$$

$$\begin{array}{r} 135 \\ 4 \\ \hline 54 \\ 540 \\ \hline 594 \end{array}$$

$$\begin{array}{r} 44 \\ \times 1.35 \\ \hline 220 \\ 132 \\ 440 \\ \hline 59.40 \end{array}$$

$$\begin{aligned}
 \text{ii) T.S.A of a tank} &= 2\pi r(h+r) \\
 &= 2 \times \frac{44}{7} \times \frac{3}{10} (4.5 + 2.1) \\
 &= 44 \times 0.3 \times 6.6 \\
 &= 87.12 \text{ m}^2
 \end{aligned}$$

Let area of Sheet used be ' $x$ ' m<sup>2</sup>

$$\text{Amount of Sheet wasted} = \frac{1}{12} x$$

$$\begin{aligned}
 \therefore \text{Sheet used to make the tank} &= x - \frac{x}{12} \\
 &= \frac{12x - x}{12} \\
 &= \frac{11x}{12}
 \end{aligned}$$

$$\therefore \frac{11x}{12} = 87.12 \text{ m}^2$$

$$\begin{array}{r}
 44 \\
 \times 0.3 \\
 \hline
 132 \\
 1320 \\
 \hline
 13.2
 \end{array}$$



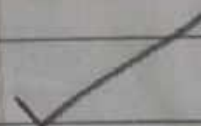
$$x = \frac{7.92}{87.12} \times 12$$

$$= 95.04 \text{ m}^2 \quad \checkmark$$

The metal sheet used is  $95.04 \text{ m}^2$

Ans  $\Rightarrow$  i)  $59.4 \text{ m}^2$

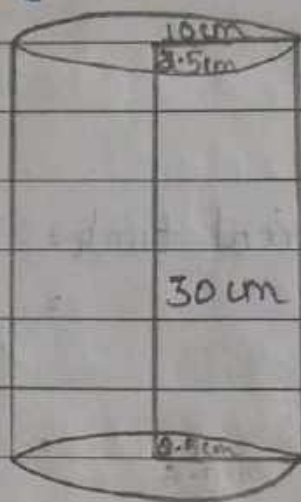
ii)  $95.04 \text{ m}^2$



$$\begin{array}{r} 11 \overline{) 8712} \\ 77 \phantom{00} \\ \hline 101 \phantom{00} \\ 99 \phantom{00} \\ \hline 22 \phantom{00} \\ 22 \phantom{00} \\ \hline 0 \end{array}$$

$$\begin{array}{r} \textcircled{1} \\ 79 \\ \hline \textcircled{1} \textcircled{1} \\ 158 \end{array}$$

10. Refer text book pg: 217



Soln:

given:

height of lampshade = 30 cm

radius of lampshade = 10 cm

margin for folding <sup>over</sup> top and bottom = 2.5 cm

$$\begin{aligned}\text{Total height} &= 30 \text{ cm} + 2.5 \text{ cm} + 2.5 \text{ cm} \\ &= 35 \text{ cm}\end{aligned}$$

C.S.A of a cylindrical lampshade =  $2\pi rh$

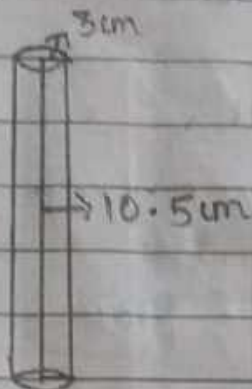
$$= 2 \times 22 \times 10 \times 35$$

$$= 440 \times 35$$

$$= 2200 \text{ cm}^2$$

Ans  $\Rightarrow$  2200 cm<sup>2</sup> of cloth is used.

11. Refer text book pg: 217



Soln:

given:

height of pen stand = 10.5 cm

Radius of base of a pen stand = 3 cm

Area of cardboard Required for 1 pen stand = C.S.A of a cylinder + area of base

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

$$= (2 \times 22 \times 3 \times 10.5) + (22 \times 3^2)$$

$$= (22 \times 9) + (22 \times 9)$$

$$= 198 + (198)$$

$$= \frac{1386 + 198}{1}$$

$$= \frac{1584}{1} \text{ cm}^2$$

Area of cardboard needed to make 35 pen stands =  $\frac{5}{35} \times \frac{1584}{1}$

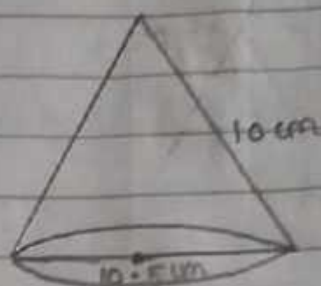
$$= 7920 \text{ cm}^2$$

Ans = 7920 cm<sup>2</sup> of cardboard is required ✓



Ex: 13.3

1. Refer text book pg: 221



Soln:

$$d = 10.5 \text{ cm}$$

$$r = \frac{10.5 \text{ cm}}{2} = \frac{10.5 \text{ cm}}{2}$$

$$l = 10 \text{ cm}$$

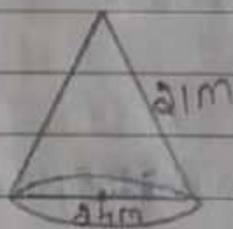
$$\begin{aligned} \text{C.S.A of a cone} &= \pi r l \\ &= \frac{22}{7} \times \frac{10.5}{2} \times 10 \end{aligned}$$

$$= 165 \text{ cm}^2$$

$$\text{Ans} = 165 \text{ cm}^2 \quad \checkmark$$

$$\begin{array}{r} 15 \\ \times 11 \\ \hline 15 \\ 150 \\ \hline 165 \end{array}$$

2. Refer text book pg: 221



Soln:

$$d = 24 \text{ m}$$

$$r = 12 \text{ m}$$

$$l = 21 \text{ m}$$

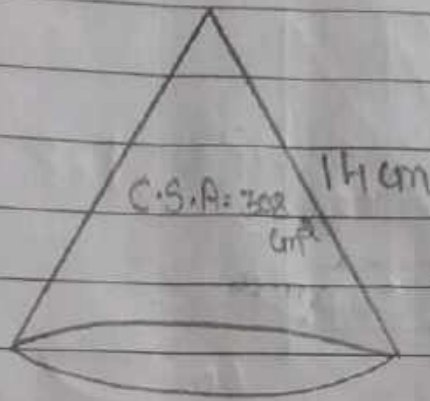
$$\begin{aligned} \text{T.S.A of a cone} &= \pi r (l + r) \\ &= \frac{22}{7} \times 12 (21 + 12) \\ &= \frac{22 \times 12 \times 33}{7} \end{aligned}$$

$$= 1244.57 \text{ m}^2$$

$$\text{Ans} = 1244.57 \text{ m}^2 \quad \checkmark$$

$$\begin{array}{r} 22 \\ \times 12 \\ \hline 44 \\ 440 \\ \hline 264 \\ \times 33 \\ \hline 792 \\ 7920 \\ \hline 8712 \\ \times 12 \\ \hline 17424 \\ \times 12 \\ \hline 20880 \\ \times 12 \\ \hline 25056 \end{array}$$

3. Refer text book pg: 221



Soln:

i) Radius of the base:

$$l = 14 \text{ cm}$$

$$\text{C.S.A of cone} = 308 \text{ cm}^2$$

$$\pi r l = 308 \text{ cm}^2$$

$$\frac{22}{7} \times r \times 14 = 308 \text{ cm}^2$$

$$\Rightarrow r = \frac{308 \times 7}{22 \times 14}$$

$$r = 7 \text{ cm}$$

$$\therefore r = 7 \text{ cm}$$

ii) T.S.A of a cone =  $\pi r (l + r)$

$$= \frac{22}{7} \times 7 (14 + 7)$$

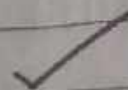
$$= 22 \times 21$$

$$= 462 \text{ cm}^2$$

$$\therefore \text{T.S.A} = 462 \text{ cm}^2$$

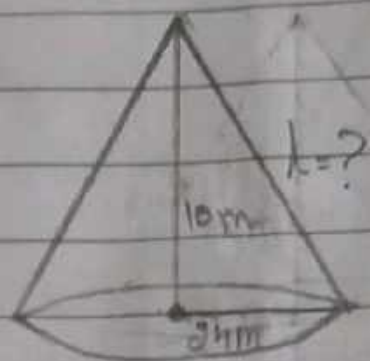
Ans  $\Rightarrow$  i) 7 cm

ii) 462 cm²





4. Refer text book pg: 221



Soln:

i) Slant height of tent:

$$r = 24 \text{ m}$$

$$h = 10 \text{ m}$$

$$\begin{aligned} l &= \sqrt{r^2 + h^2} \\ &= \sqrt{(24)^2 + (10)^2} \\ &= \sqrt{576 + 100} \\ &= \sqrt{676} \\ &= 26 \text{ m} \end{aligned}$$

ii) C.S.A of a cone =  $\pi r l$

$$= \frac{22}{7} \times 24 \times 26$$

$$= 1061.14 \text{ cm}^2 \quad \underline{13728 \text{ cm}^2}$$

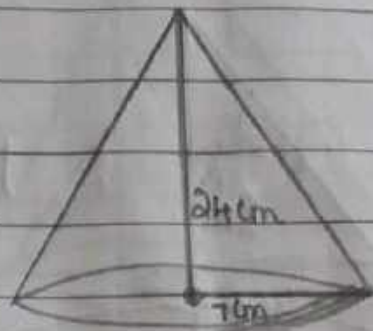
Cost of canvas per  $\text{m}^2 = ₹ 70$

$$\begin{aligned} \therefore \text{Cost of canvas for } \underline{13728 \text{ m}^2} &= ₹ 70 \times \underline{13728 \text{ m}^2} \\ &= ₹ 137280 \end{aligned}$$

Ans = ₹ 137280 ✓



7. Refer text book pg: 221



Soln:

$$r = 7 \text{ cm}$$

$$h = 24 \text{ cm}$$

$$\begin{aligned} l &= \sqrt{r^2 + h^2} \\ &= \sqrt{(7)^2 + (24)^2} \\ &= \sqrt{49 + 576} \\ &= \sqrt{625} \\ &= 25 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{C.S.A of a cone} &= \pi r l \\ &= \frac{22}{7} \times 7 \times 25 \\ &= 550 \text{ cm}^2 \end{aligned}$$

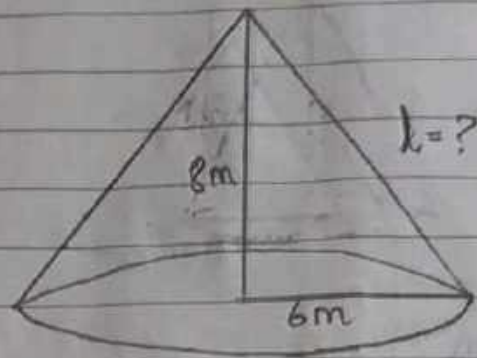
$$\text{Area of sheet required for 1 cap} = 550 \text{ cm}^2$$

$$\begin{aligned} \text{Area of sheet required for 10 cap} &= 10 \times 550 \\ &= 5500 \text{ cm}^2 \end{aligned}$$

$$\text{Ans} = 5500 \text{ cm}^2$$



5. Refer text book pg: 221



Soln:

For conical tent:

$$h = 8\text{m}$$

$$r = 6\text{m}$$

$$\begin{aligned} l &= \sqrt{r^2 + h^2} \\ &= \sqrt{6^2 + 8^2} \\ &= \sqrt{36 + 64} \\ &= \sqrt{100} \\ &= 10\text{m} \end{aligned}$$

$$\text{Area of tarpaulin sheet} = \text{C.S.A of tent}$$

$$\begin{aligned} &= \pi r l \\ &= 3.14 \times 6 \times 10 \\ &= 188.4\text{m}^2 \end{aligned}$$

$$\text{Breadth of sheet} = 3\text{m}$$

$$\text{Length of sheet} = l\text{m}$$

$$\Rightarrow l \times 3 = 188.4\text{m}^2$$

$$\Rightarrow l \times 3\text{m} = 188.4\text{m}^2$$

$$\Rightarrow l = \frac{188.4}{3} = 62.8$$

$$l = 62.8\text{m}$$

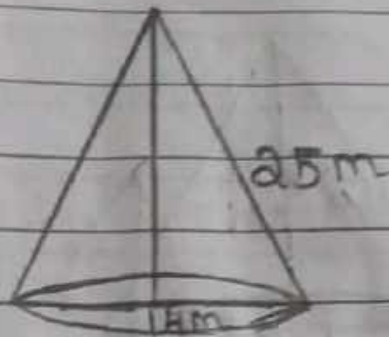
$$\text{Wastage} = 20\text{cm}$$

$$= 0.2\text{m}$$

$$\begin{aligned} \text{Length of tarpaulin sheet} &= 62.8 + 0.2 \\ &= 63\text{m} \end{aligned}$$

Ans = 63m long tarpaulin. ✓

6 Refer text book pg: 221



Soln:

given:

$$l = 25\text{m}$$

$$d = 14\text{m}$$

$$r = 7\text{m}$$

$$\begin{aligned}\text{C.S.A of conical tomb} &= \pi r l \\ &= \frac{22}{7} \times 7 \times 25\end{aligned}$$

$$= 550\text{m}^2$$

$$\text{Cost of whitewashing per } 100\text{m}^2 = ₹ 210$$

$$\text{Cost of whitewashing per } 550\text{m}^2 = \frac{210}{100} \times 550$$

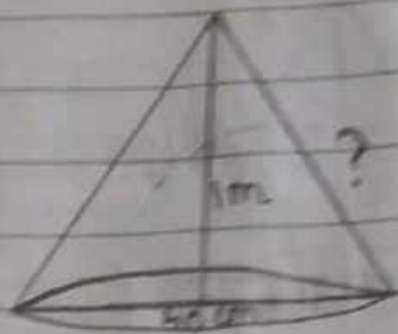
$$= ₹ 1155$$

Ans = ₹ 1155
--------------





8. Refer test book pg: 221



given:

$$d = 40 \text{ cm}$$

$$r = 20 \text{ cm}$$

$$= 0.2 \text{ m}$$

$$h = 1 \text{ m}$$

$$l = \sqrt{r^2 + h^2}$$

$$= \sqrt{(0.2)^2 + (1)^2}$$

$$= \sqrt{0.04 + 1}$$

$$= \sqrt{1.04}$$

$$l = 1.02 \text{ m}$$

$$\text{C.S.A of cone} = \pi r l$$

$$= 3.14 \times 0.2 \times 1.02$$

$$= 0.64056 \text{ m}^2$$

$$\text{C.S.A of 50 cone} = 50 \times 0.64056 \text{ m}^2$$

$$= 32.028 \text{ m}^2$$

$$\text{Cost of painting } \text{₹} 12 \text{ per m}^2 = \text{₹} 12$$

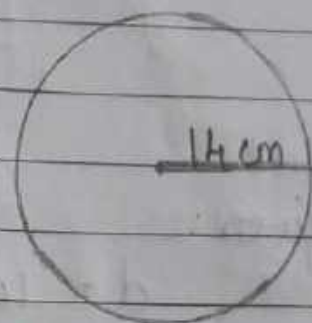
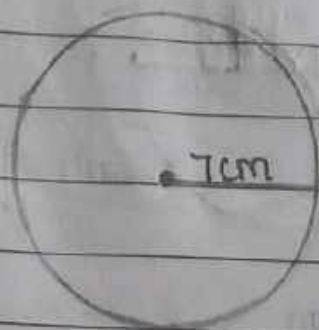
$$\text{Cost of painting } \text{₹} 12 \times 32.028$$

$$= \text{₹} 384.33 \text{ (approx)}$$

$$\text{Ans} = \text{₹} 384.33 \text{ (approx)}$$

Ex: 13.4

Refer text book pg: 225



Soln:

given:

Case 1:

$$r = 7 \text{ cm}$$

$$\text{T.S.A of a balloon} = 4\pi r^2$$

~~$$= 4\pi \times 7 \times 7 \text{ cm}^2$$~~

$$= 4\pi \times 7 \times 7 \text{ cm}^2$$

Case 2:

$$r = 14 \text{ cm}$$

$$\text{T.S.A of a balloon} = 4\pi r^2$$

$$= 4\pi \times 14 \times 14 \text{ cm}^2$$

$$\text{Required Ratio} = \frac{4\pi \times 7 \times 7}{4\pi \times 14 \times 14}$$

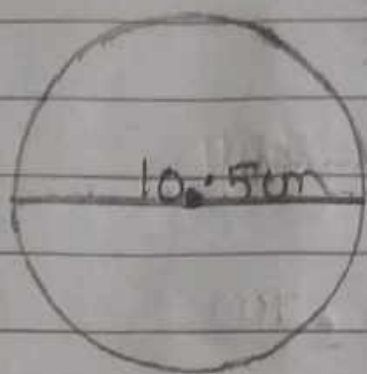
$$= \frac{1}{4}$$

$$= 1:4$$

$$\text{Ans} = 1:4$$



5. Refer text book pg: 225



Given:

$$d = 10.5 \text{ cm}$$

$$r = 5.25 \text{ cm}$$

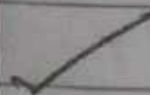
$$\begin{aligned} \text{C.S.A of hemispherical bowl} &= 2\pi r^2 \\ &= \frac{1}{2} \times \frac{22}{7} \times \frac{75}{100} \times \frac{75}{100} \times 4 \\ &= \frac{693}{4} \end{aligned}$$

$$= 173.25 \text{ cm}^2$$

$$\text{Cost of tin-plating per } 100 \text{ cm}^2 = ₹ 16$$

$$\begin{aligned} \text{Cost of tin plating per } 173.25 \text{ cm}^2 &= ₹ 16 \times \frac{173.25}{100} \\ &= ₹ 27.72 \\ &= ₹ 27.72 \end{aligned}$$

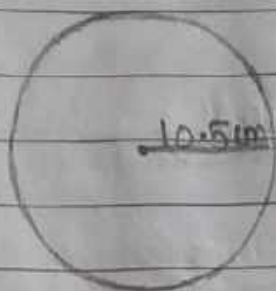
$$\text{Ans} = ₹ 27.72$$





1. Find the Surface area of a Sphere of radius:

i) 10.5 cm



Soln:

given:

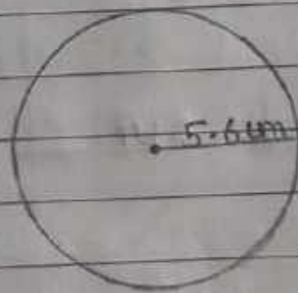
$$r = 10.5 \text{ cm}$$

$$\begin{aligned} \text{T.S.A of Sphere} &= 4\pi r^2 \\ &= 4 \times \frac{22}{7} \times 10.5 \times 10.5 \\ &= 6 \times 231 \\ &= 1386 \text{ cm}^2 \end{aligned}$$

$$\text{Ans} = 1386 \text{ cm}^2$$



ii) 5.6 cm



Soln:

given:

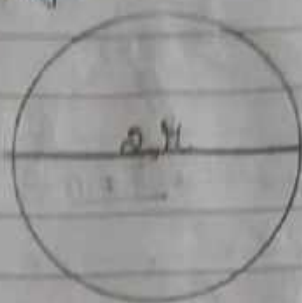
$$r = 5.6 \text{ cm}$$

$$\begin{aligned} \text{T.S.A of Sphere} &= 4\pi r^2 \\ &= 4 \times \frac{22}{7} \times 5.6 \times 5.6 \\ &= 17.6 \times 22.4 \\ &= 394.24 \text{ cm}^2 \end{aligned}$$

$$\text{Ans} = 394.24 \text{ cm}^2$$



7. Refer text book pg: 225



Soln:

For Earth:

$$D = 2R$$

$$R = R$$

$$T.S.A = 4\pi R^2$$

For moon:

$$D = \frac{1}{4} \text{ of (Diameter of Earth)}$$

$$= \frac{1}{4} \times 2R$$

$$= \frac{1R}{2} = \frac{R}{2}$$

$$\therefore D = \frac{R}{2}$$

$$R = \frac{D}{2}$$

$$= \frac{\frac{R}{2}}{2} \times \frac{1}{2}$$

$$\therefore R = \frac{R}{4}$$

$$T.S.A \text{ of moon} = 4\pi R^2$$

$$= 4\pi \times \left(\frac{R}{4}\right)^2 = \pi \times \frac{R^2}{4}$$

$$= \frac{\pi R^2}{4}$$

$$\frac{T.S.A \text{ of moon}}{T.S.A \text{ of earth}} = \frac{\frac{\pi R^2}{4}}{4\pi R^2}$$

$$= \frac{1}{4} \times \frac{1}{4}$$

$$= \frac{1}{16}$$

$$= 1:16$$

Required ratio = 1:16

$$\boxed{\text{Ans} = 1:16} \quad \checkmark$$



A circle is drawn on lined paper. A radius is drawn from the center to the circumference, labeled "5 cm".

gives:

Thickness = 0.25 cm

$$\begin{aligned}\text{Outer Curved Surface area} &= 2\pi R^2 \times 0.75 \\ &= 2 \times \frac{22}{7} \times 5.25 \times 5.25 \\ &= 16.5 \times 10.5 \\ &= 173.25 \text{ cm}^2\end{aligned}$$

Ans =  $173.25 \text{ cm}^2$

✓

①



42

75

11 e

154

185

57

10

00

③②

10

① 100

② ③ ④

000

165

172.5



9. Refer text book pg: 225



Soln:

given:

i) S.A. of Sphere:

radius,  $r$  (of Sphere) =  $r$

$$\text{S.A of Sphere} = 4\pi r^2$$

$$= 4\pi r^2$$

ii) C.S.A of a cylinder:

$$r = r$$

$$h = 2r$$

$$\begin{aligned}\text{C.S.A of a cylinder} &= 2\pi rh \\ &= 2\pi r \times (2r) \\ &= 4\pi r^2\end{aligned}$$

iii) Ratio of surface areas required =  $\frac{4\pi r^2}{4\pi r^2}$

$$= \frac{1}{1}$$

$$= 1:1$$

Ans: i)  $4\pi r^2$

ii)  $4\pi r^2$

iii) 1:1