Exercise – 20.1

1. Find the curved surface area of a cone, if its slant height is 60 cm and the radius of its base is 21 cm.

Sol:

Given that

Radius of its base is 21cm

Slant height $= 60cm$

WKT, Curved surface area of a cone $= \pi rl$

$\therefore$ Curved surface area $= \frac{22}{7} \times 21 \times 60$

$= 3960 cm^2$

2. The radius of a cone is 5 cm and vertical height is 12 cm. Find the area of the curved surface.

Sol:

Given,

Radius of cone $= 5cm = r$

Height of a cone $= 12cm = h$

Slant height of the cone $= \sqrt{r^2 + h^2}$

$= \sqrt{5^2 + 12^2} = 13cm$

$\therefore$ Curved surface Area $= \pi rl$

$= \frac{22}{7} \times 5 \times 12$

$= 204 \cdot 28 cm^2$

3. The radius of a cone is 7 cm and area of curved surface is 176 cm^2. Find the slant height.

Sol:

Given

Radius of a cone $(r) = 7cm.$

Let $'l'$ be the slant height of a cone

$\therefore$ Curved surface area $= \pi rl.$

$\Rightarrow 176 = \pi \times 7 \times l$

$\Rightarrow l = \frac{176}{7\pi} = \frac{176 \times 7}{7 \times 22} = 8cm.$

4. The height of a cone is 21 cm. Find the area of the base if the slant height is 28 cm.

Sol:

Given that

Slant height ‘l’ $= 28m.$

Height of cone $(h) = 21cm$

$\therefore$ Radius of cone $(r) = \sqrt{28^2 - 21^2}$ [by Pythagoras theorem]

$= 7\sqrt{7}cm$

$\therefore$ Area of base $= \pi r^2$

$= \frac{22}{7} \times (7\sqrt{7})^2$

$= \frac{22}{7} \times 7 \times 7 \times 7 = 1078cm^2.$

5. Find the total surface area of a right circular cone with radius 6 cm and height 8 cm.

Sol:

WKT, Total surface area $= \pi rl + \pi r^2$

Now $l = \sqrt{h^2 + r^2}$ [by Pythagoras theorem]

Here, given

Radius $= 6cm$ and height $= 8cm$

$\Rightarrow$ length $= \sqrt{6^2 + 8^2}$

$= 10cm$

$\therefore$ Total surface area $= \pi rl + \pi r^2$

$= \left(\frac{22}{7} \times 6 \times 10\right) + \left(\frac{22}{7} \times 6 \times 6\right)$

$= \left(\frac{1320}{7}\right) + \frac{792}{7} = 301 \cdot 71cm^2$

6. Find the curved surface area of a cone with base radius 5.25 cm and slant height 10cm.

Sol:

Given that,

Radius of a base of a cone $= 5 \cdot 25cm$

Slant height of cone $= 10cm$

Curved surface area of cone $= \pi rl$

$= \frac{22}{7} \times 5 \cdot 25 \times 10cm^2$

$= (22 \times 0 \cdot 75 \times 10)cm^2$

$= 165cm^2$

Thus, the curved surface area of a cone is

$165cm^2$

7. Find the total surface area of a cone, if its slant height is 21 m and diameter of its base is 24m.

Sol:

Given that,

Radius of base of cone $=\left(\frac{24}{2}\right)=12m$

Slant height of cone $=21m.$

Total surface area of cone $=\pi r^2+\pi rl$

$=\pi r(r+l)$

$=\frac{22}{7}\times 12\times(12+21)$

$=\frac{22}{7}\times 12\times 33m^2$

$=1244\cdot 57m^2.$

8. The area of the curved surface of a cone is 60 π cm^2. If the slant height of the cone be 8 cm, find the radius of the base?

Sol:

Given that

Curved surface area of cone $=60\pi cm^2$

$\therefore$ Slant height of cone $(l)=8cm.$

$i.e.,\ \pi rl=60\pi$

$\Rightarrow \pi\times r\times 8=60\pi$

$\Rightarrow r=\frac{60}{8}=7\cdot 5$

$\therefore$ Radius of cone $=7\cdot 5cm.$

9. The curved surface area of a cone is 4070 cm^2 and its diameter is 70 cm. What is its slant height? (Use it π = 22/7).

Sol:

Given diameter $=70cm$

$\Rightarrow 2r=70cm$

$\Rightarrow r=35cm$

Now, curved surface area $=4070cm^2$

$\Rightarrow \pi rl=4070$

Where $r=$ radius of the cone

$l=$ slant height of the cone

$\therefore \pi rl=4070$

$\Rightarrow \frac{22}{7} \times 35 \times l = 4070$

$\Rightarrow l = \frac{4070 \times 7}{22 \times 35} = 37cm$

$\therefore$ Slant height of the cone $= 37cm.$

10. The radius and slant height of a cone are In the ratio of 4 : 7. If its curved surface area is 792 cm^2, find its radius. (Use it π = 22/7).

Sol:

Given that,

Curved surface area $= \pi rl = 792.$

Let the radius $(r) = 4x$

Height $(h) = 7x$

Now, CSA $= 792$

$\frac{22}{7} \times 4x \times 7x = 792$

$\Rightarrow 88x^2 = 792$

$\Rightarrow x^2 = \frac{792}{88} = 9.$

$\Rightarrow x = 3.$

$\therefore$ Radius $= 4x = 4 \times 3 = 12cm.$

11. A Joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.

Sol:

Given that,

Radius of conical cap $(r) = 7cm.$

Height of conical cap $(h) = 24cm.$

Slant height (I) of conical cap $= \sqrt{r^2 + h^2}$

$= \sqrt{(7)^2 + (24)^2} cm$

$= 25cm$

CSA of 1 conical cap $= \pi rl = \frac{22}{7} \times 7 \times 25 cm^2 = 550cm^2$

Curved surface area of such 10 conical caps $= 5500cm^2$

$[\because 550 \times 10]$

Thus, $5500cm^2$ sheet will be req for making of 10 caps.

12. Find the ratio of the curved surface areas of two cones if their diameters of the bases are equal and slant heights are in the ratio 4 : 3.

Sol:

Given that,

Diameter of two cones area equal

$\therefore$ Their radius are equal

Let $r_1 = r_2 = r$

Let ratio be x

$\therefore$ Slant height l_1 of 1^{st} cone $= 4x$

Similarly slant height l_2 of 2^{nd} cone $= 3x$.

$$\therefore \frac{C \cdot S\ A_1}{C \cdot S\ A_2} = \frac{\pi r_1 l_1}{\pi r_2 l_2} = \frac{\pi \times r \times 4x}{\pi \times r \times 3x} = \frac{4}{3}.$$

13. There are two cones. The curved surface area of one is twice that of the other. The slant height of the later is twice that of the former. Find the ratio of their radii.

Sol:

Let curved surface area off 1^{st} cone $= 2x$

CSA of 2^{nd} cone = x

and slant height of 1^{st} cone = h

and slant height of 2^{nd} cone = 2h

$$\therefore \frac{CSA\ of\ 1^{st}\ cone}{CSA\ of\ 2^{nd}\ cone} = \frac{2x}{x} = \frac{2}{1}.$$

$$\Rightarrow \frac{\pi r_1 l_1}{\pi r_2 l_2} = \frac{2}{1}$$

$$\Rightarrow \frac{r_1 h}{r_2 h} = \frac{2}{1} \Rightarrow \frac{r_1}{r_2} = \frac{4}{1}.$$

i.e., ratio of r_1 *and* r_2 is $(4:1)$

14. The diameters of two cones are equal. If their slant heights are in the ratio 5 : 4, find the ratio of their curved surfaces.

Sol:

Given that,

Diameters of two cones are equal

$\therefore$ Their radius are also equal i.e., $r_1 = r_2$

Let the ratio of slant height be x

$\therefore l_1 = 5x\ and\ l_2 = 4x$

$\therefore$ Ratio of curved surface area $= \frac{C_1}{C_2}$

$$\therefore \frac{C_1}{C_2} = \frac{\pi r_1 l_1}{\pi r_2 l_2} = \frac{\pi r_1 Sx}{\pi r_2 (4x)} = \frac{5}{4}$$

$\therefore$ Ratio of curved surface area $= 5:4$

15. Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find the radius of the base and total surface area of the cone.

Sol:

(i) Given that,

Slant height of cone $= 14cm$

Let radius of circular end of cone = r.

Curved surface area of cone $= \pi rh$

$$308cm^2 = \left(\frac{22}{7} \times r \times 14\right)cm \qquad [\because CSA = 308cm^2)$$

$$\Rightarrow r = \frac{308}{44}cm = 7cm$$

Thus, radius of circular end of cone $= 7cm$

(ii) Given that CSA $= 308cm^2$

WKT, total surface area of cone

= curved surface area of cone + area of base

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

$$= \left[308 + \frac{22}{7}(7)^2\right]cm^2$$

$= 308 + 154cm^2$

$= 462cm^2$

Thus, the total SA of the cone is $462cm^2$.

16. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of white-washing its curved surface at the rate of Rs. 210 per l00 m^2.

Sol:

Given that,

Slant height of conical tomb (l) =25m

Base radius (r) of tomb $= \frac{14}{2}m = 7m.$

CSA of conical length tomb $= \pi rl$

$$= \left(\frac{22}{7} \times 7 \times 25\right)m^2$$

$= 550m^2$

Cost of white – washing $100m^2$ area = Rs. 210

Cost of white – washing $550\,m^2$ area = $Rs.\left(\frac{210\times550}{100}\right)$

$= Rs.\,1155.$

Thus the cost of white washing total tomb = Rs. 1155

17. A conical tent is 10 m high and the radius of its base is 24 m. Find the slant height of the tent. If the cost of 1 m^2 canvas is Rs. 70, find the cost of the canvas required to make the tent.

Sol:

(i) Given that

Height of conical tent $(h) = 10m$

Radius of conical tent $(r) = 24m.$

Let slant height of conical tent be l

$l^2 = h^2 + r^2 = (10m)^2 + (24m)^2 = (100+576)m^2$

$= 676m^2$

$l = 26m.$

Thus, the slant height of the conical tent is $26m.$

(ii) Given that

Radius $(r) = 24$

Slant height $(l) = 26$

CSA of tent $= \pi rl = \frac{22}{7}\times24\times26 = \frac{13728}{7}m^2$

Cost of $1m^2$ canvas $S = Rs.70.$

Cost of $\frac{13728}{7}m^2$ canvas $= \frac{13728}{7}\times10$

$= Rs.1,37,280.$

Thus, the cost of canvas required to make the tent is Rs. $137280.$

18. A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of cylinder is 24 m. The height of the cylindrical portion is 11 m while the vertex of the cone is 16 m above the ground. Find the area of the canvas required for the tent.

Sol:

Given that,

Diameter of cylinder $= 24m$

$\therefore$ Radius $= \frac{\text{diameter}}{2} = \frac{24cm}{2} = 12cm$

Also Radius of cone $=12m.$
Height of cylinder $=11m$
Height of cone $=16-11=5m$
Slant height of cone $=\sqrt{h^2+r^2}$
$=\sqrt{5^2+12^2}=13m$
$\left[\because l=\sqrt{r^2+h^2}\right]$
$\therefore$ area of canvas required for the
tent $=\pi rl+2\pi rh$
$=\frac{22}{7}\left[12\times13+2\times12\times11\right]$
$=490\cdot285+829\cdot714$
$=1320m^2.$

19. A circus tent is cylindrical to a height of 3 meters and conical above it. If its diameter is 105 m and the slant height of the conical portion is 53 m, calculate the length of the canvas 5 m wide to make the required tent.

Sol:
Given diameter $=105m$
Radius $=\frac{105}{2}m=52\cdot5m.$
$\therefore$ Curved surface area of circus tent $=\pi rl+2\pi rh$
$=\frac{22}{7}\times52\cdot5\times53+2\times52\cdot5\times3\times\frac{22}{7}$
$=8745+990$
$=9735m^2$
$\therefore$ Length of the canvas equation for tent $=\frac{\text{Area of canvas}}{\text{width of canvas}}$
$=\frac{9735}{5}=1947m$

20. The circumference of the base of a 10 m height conical tent is 44 metres. Calculate the length of canvas used in making the tent if width of canvas is 2 m. (Use it π= 22/7).

Sol:
WKT, CSA of cone = πrl
Given circumference $=2\pi r$
$\Rightarrow 2\times\frac{22}{7}\times r=44\Rightarrow\frac{r}{7}=1\Rightarrow r=7m$

$\therefore L = \sqrt{r^2 + h^2} = \sqrt{7^2 + 10^2} = \sqrt{149} m$

$\therefore CSA$ of tent $= \pi r l = \frac{22}{7} \times 7 \times \sqrt{149} = 22\sqrt{149}.$

$\therefore$ The length of can vas used in making tent

$= \frac{\text{Area of canvas}}{\text{width of canvas}}$

$= \frac{22\sqrt{149}}{2} = 11\sqrt{149}$

$= 134 \cdot 2m.$

21. What length of tarpaulin 3 m wide will be required to make a conical tent of height 8 m and base radius 6 m? Assume that the extra length of material will be required for stitching margins and wastage in cutting is approximately 20 cm (Use it π = 3.14)

Sol:

Given that,

Height of conical tent $(h) = 8m.$

Radius of base of tent $(r) = 6m.$

Slant height $(l) = \sqrt{r^2 + h^2} = \sqrt{8^2 + 6^2} = \sqrt{100} = 10m$

CSA of conical tent $= \pi r l = (3 \cdot 14 \times 6 \times 10) m^2$

$= 188 \cdot 4m^2$

Let the length of tarpaulin sheet require be L

As 200m will be wasted, So effective length will be $(L - 0 \cdot 2m)$

Breadth of tarpaulin $= 3m$

Area of sheet $=$ CSA of sheet

$(L \times 0 \cdot 2m \times 3) m = 188 \cdot 40 m^2$

$\Rightarrow L - 0 \cdot 2m = 62 \cdot 8m$

$\Rightarrow L = 63m$

Thus, the length of the tarpaulin sheet will be $= 163m.$

22. A bus stop is barricated from the remaining part of the road, by using 50 hollow cones made of recycled card-board. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is Rs. 12 per m^2, what will be the cost of painting all these cones. (Use π = 3.14 and $\sqrt{1.04}$ = 1.02)

Sol:

Radius of cone $(r) = \frac{40}{2} = 20m = 0 \cdot 2m.$

Height of cone $= 1m.$

Slant height of cone $(l) = \sqrt{h^2 + r^2}$

$= \sqrt{1^2 + (0\cdot 2)^2}\, m$

$= \sqrt{1\cdot 04}m = 1\cdot 02m$

Curved surface area of each one

$= \pi rl = (3\cdot 14 \times 0\cdot 2 \times 1\cdot 02)m^2$

$= 0\cdot 64056m^2$

CSA of 50 such cone $= 50 \times 0\cdot 64056m^2 = 32\cdot 028m^2$

Cost of painting $1m^2$ area = Rs. 12.

Cost of painting $32\cdot 028m^2$ area $= Rs.(32\cdot 028 \times 12)$

$= Rs.\ 384\cdot 326\ PS.$

Thus, it will cost Rs. 38434 (Approx) in painting the so hollow cones.

23. A cylinder and a cone have equal radii of their bases and equal heights. If their curved surface areas are in the ratio 8:5, show that the radius of each is to the height of each as 3:4.

Sol:

Let us assume radius of cone $= r.$

Also, radius of cylinder $= r.$

Height of cone $= h$

And, height of cylinder $= h.$

Let C_1, be the curved surface area of cone

$\therefore C_1 = \pi r\sqrt{r^2 + h^2}$

Similarly, C_2 be the curved surface area of cone cylinder.

$\therefore C_2 = 2\pi rh$

According to question $\frac{C_2}{C_1} = \frac{8}{5}.$

$\Rightarrow \frac{2\pi rh}{\pi r\sqrt{r^2 + h^2}} = \frac{8}{5}$

$\Rightarrow 10h = 8\sqrt{r^2 + h^2}$

$\Rightarrow 100h^2 = 64r^2 + 64h^2$

$\Rightarrow 36h^2 = 64r^2$

$\frac{h}{r} = \sqrt{\frac{64}{30}}$

$\Rightarrow \left(\frac{h}{r}\right)^2 = \frac{64}{36}$

$\Rightarrow \frac{b}{r} = \sqrt{\frac{64}{30}} = \frac{8}{6} = \frac{4}{3}$

$\therefore \frac{r}{h} = \frac{3}{4}.$

Exercise – 20.2

1. Find the volume of a right circular cone with:

(i) radius 6 cm, height 7 cm.

(ii) radius 3.5 cm, height 12 cm

(iii) height 21 cm and slant height 28 cm.

Sol:

(i) Given that,

Radius of cone $(r) = 6m$

Height of cone $(h) = 7cm$

Volume of cone $= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times (6)^2 \times 7$

$= 264cm^3$

(ii) Given,

Radius of cone $(r) = 3\cdot 5cm$

Height of cone $(h) = 12cm$

Volume of cone $= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times (3\cdot 5)^2 \times 12$

$= 154cm^3$

(iii) From the relation

$l^2 = r^2 + h^2$, we have

$r = \sqrt{l^2 - h^2} = \sqrt{(28)^2 - (21)^2} = 7\sqrt{7}cm$

So, volume of cone $= \frac{1}{3} \times \pi r^2 \times h$

$= \frac{1}{3} \times \frac{22}{7} \times (21)^2 \times \left(7\sqrt{7}\right)^2$

$= 7546cm^3$

2. Find the capacity in litres of a conical vessel with:
(i) radius 7 cm, slant height 25 cm (ii) height 12 cm, slant height 13 cm.
Sol:

(i) Radius of cone $(r)=7cm$

Slant height (l) of cone $=25cm$

Height (h) of cone $=\sqrt{l^2-r^2}$

$=\sqrt{(25)^2-b^2}=\sqrt{25^2-7^2}=24cm.$

Volume of cone $=\frac{1}{3}\pi r^2 h=\left[\frac{1}{3}\times\frac{22}{7}\times(7)^2\times 24\right]cm^3$

$=1232\ cm^3.$

(ii) Height (h) of cone = 12cm.

Slant height of cone $(l)=13cm.$

Radius (r) of cone $=\sqrt{l^2-r^2}=\sqrt{13^2-12^2}cm$

$=5cm.$

Volume of cone $=\frac{1}{3}\pi r^2 h=\left(\frac{1}{3}\times\frac{22}{7}\times(5)^2\times 12\right)cm^3$

$=\frac{2200}{7}cm^3$

Capacity of the conical vessel $=\left(\frac{2200}{7000}\right)liters$

$=\frac{11}{35}liters$

3. Two cones have their heights in the ratio 1 : 3 and the radii of their bases in the ratio 3 : 1. Find the ratio of their volumes.
Sol:
Given that, let height $\rightarrow h$ say
Height of 1^{st} cone = h
Height of 2^{nd} cone = 3h
Let the ratio of radii be r
$\therefore$ Radius of 1^{st} cone = 3r
Radius of 2^{nd} cone = r
$\therefore$ ratio of volume $=\frac{V_1}{V_2}$

$\Rightarrow \frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{r_1^2 h_1}{r_2^2 h_2}$

$= \frac{(3r)^2 \times h}{r^2 \times 3h}$

$= \frac{9r^2 h}{3r^2 h}$

$= \frac{3}{1}$

$\Rightarrow \frac{V_1}{V_2} = \frac{3}{1}.$

4. The radius and the height of a right circular cone are in the ratio 5 : 12. If its volume is 314 cubic meter, find the slant height and the radius (Use it π = 3.14).

Sol:

Let the ratio be x

$\therefore$ Radius $'r' = 5x$

Height 'h' = $12x$

WKT,

$\therefore$ Slant height $= \sqrt{r^2 + h^2} = \sqrt{(5x)^2 + (12x)^2} = 13x$

Now volume $= 314m^3$ [given data]

$\Rightarrow \frac{1}{3}\pi r^2 h = 314m^3$

$\Rightarrow \frac{1}{3} \times 3\cdot 14 \times 25x^2 \times 12x = 314$

$\Rightarrow x^3 = \frac{314 \times 3}{3\cdot 14 \times 25 \times 12}$

$\Rightarrow x^3 = 1 \Rightarrow x = 1$

$\therefore$ Slant height $= 13x = 13m$

Radius $= 5x = 5m.$

5. The radius and height of a right circular cone are in the ratio 5 : 12 and its volume is 2512 cubic cm. Find the slant height and radius of the cone. (Use it π = 3.14).

Sol:

Let the ratio be x

Radius 'r' = $5x$

Height 'h' = $12x$

$\therefore$ Slant height $'l' = \sqrt{r^2 + h^2} = \sqrt{(5x)^2 + (12x)^2} = 13x.$

Now volume $= 2512 cm^3$

$\Rightarrow \frac{1}{3} \times \pi \times (5x)^2 \times 12x = 2512$

$\Rightarrow \frac{1}{3} \times 3 \cdot 14 \times 25x^2 \times 12x = 2512$

$\Rightarrow x^3 = \frac{2512 \times 3}{314 \times 25 \times 2}$

$\Rightarrow x = 2.$

$\therefore$ Slant height $= 13x = 13 \times 2 = 26cm$

And, Radius of cone $= 5x = 5 \times 2 = 10cm.$

6. The ratio of volumes of two cones is 4 : 5 and the ratio of the radii of their bases is 2:3. Find the ratio of their vertical heights.

Sol:

Let ratio of radius be $'r'$

Radius of 1st cone = 2r

Radius of 2nd cone = 3r

Similarly

Let volume ratio be 'v'

Volume of 1st cone $\rightarrow 4v$

Similarly volume of 2nd cone $\rightarrow 5v$

$\therefore \frac{V_1}{V_2} = \frac{4v}{5v} = \frac{4}{5}$

$\Rightarrow \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{4}{5}$

$\Rightarrow \frac{h_1 (2r)^2}{h_2 (3r)^2} = \frac{4}{5}$

$\Rightarrow \frac{h_1}{h_2} \times \frac{4r^2}{9r^2} = \frac{4}{5}$

$\Rightarrow \frac{h_1}{h_2} \times \frac{36}{20} = \frac{18}{20} = \frac{9}{5}$

$\therefore$ Ratio of the inner height is $9:5$

7. A cylinder and a cone have equal radii of their bases and equal heights. Show that their volumes are in the ratio 3:1.

Sol:

Given that,

A cylinder and a cone have equal radii of their equal bases and heights

Let radius of cone = radius of cylinder = r

Let height of cone = height of cylinder = h

Let $V_1 =$ volume of cone

$V_2 =$ volume of cylinder

$$\Rightarrow \frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r^2 h}{\pi r^2 h} = \frac{1}{3}$$

$$\Rightarrow \frac{V_2}{V_1} = \frac{3}{1}$$

Hence their volumes are in the ratio $3:4$.

8. If the radius of the base of a cone is halved, keeping the height same, what is the ratio of the volume of the reduced cone to that of the original cone?

Sol:

Let radius of cone is r and height is h

Volume $V_1 = \frac{1}{3}\pi r^2 h.$

In another case,

Radius of cone = half of radius $= \frac{r}{2}$

Height $= h$

$\therefore$ Volume $= (V_2) = \frac{1}{3}\pi\left(\frac{1}{2}r\right)^2 h$

$$= \frac{1}{3}\pi \times \frac{r^2}{4} \times h$$

$$= \frac{1}{12}\pi r^2 h.$$

$$\therefore \frac{V_1}{V_2} = \frac{\frac{1}{12}\pi r^2 h}{\frac{1}{3}\pi r^2 h} = \frac{3}{12} = \frac{1}{4}.$$

$\therefore$ Ratio will be $(1:4)$.

9. A heap of wheat is in the form of a cone of diameter 9 m and height 3.5 m. Find its volume. How much canvas cloth is required to just cover the heap? (Use π = 3.14).

Sol:

Diameter of heap $d = 9m$

Radius $= \frac{9}{2}m = 4\cdot 5m.$

Height $(h) = 3\cdot 5m.$

Volume of heap $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\left[3\cdot 14\times(4\cdot 5)^2\times 3\cdot 5\right]m^3$

$= 74\cdot 18m^3$

Slant height $l = \sqrt{r^2+h^2} = \sqrt{(4\cdot 5)^2+(3\cdot 5)^2}$

$= 5\cdot 70m.$

Area of canvas required = CSA of cone

$= \pi rl$

$= 3\cdot 14\times 4\cdot 5\times 5\cdot 7m^2$

$= 80\cdot 54m^2$

10. A heap of wheat is in the form of a cone of diameter 9 m and height 3.5 m. Find its volume. How much canvas cloth is required to just cover the heap? (Use π = 3.14).

Sol:

Given diameter of cone 14cm

$\therefore$ Radius of cone $= 7cm$

Height of cone $= 51cm.$

$\therefore$ Volume of cone $= \frac{1}{3}\times\pi r^2 h$

$= \frac{1}{3}\times\frac{22}{7}\times 7\times 5\times 51$

$= 2618cm^3$

It is given that $1cm^3$ weight 10gm

$\therefore$ $2618cm^3$ weight $(261\times 10)gm$

i.e., $26\cdot 180kg.$

11. A right angled triangle of which the sides containing he right angle are 6.3 cm and lo cm in length, is made to turn round on the longer side. Find the volume of the solid, thus generated. Also, find its curved surface area.

Sol:

Given, radius of cone $(r) = 6 \cdot 3cm$

Height of cone $(h) = 10cm$

$\therefore$ WKT, Slant height $l = \sqrt{(6 \cdot 3)^2 + (10)^2}$

$= 11 \cdot 819cm \left[l = \sqrt{r^2 + h^2} \right]$

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 3 \cdot 14 \times (6 \cdot 3)^2 \times 10 = 4158cm^3$

And CSA of cone $= \pi rl$

$= \frac{22}{7} \times 6 \cdot 3 \times 11 \cdot 819 = 234 \cdot 01cm^2$

12. Find the volume of the largest right circular cone that can be fitted in a cube whose edge is 14 cm.

Sol:

For largest circular cone radius of the base of the cone $= \frac{1}{2}$ edge of cube

$= \frac{1}{2} \times 14 = 7cm$

And height of the cone $= 14cm$

Volume of cone $= \frac{1}{3} \times 3 \cdot 14 \times 7 \times 7 \times 14$

$= 718 \cdot 666\,cm^3$.

13. The volume of a right circular cone is 9856 cm^3. If the diameter of the base is 28 cm, find: (i) height of the cone (ii) slant height of the cone (iii) curved surface area of the cone.

Sol:

(i) Radius of cone $= \left(\frac{28}{2}\right) cm = 14cm$

Let height of cone is h

Volume of cone $= 9856cm^3$

$\Rightarrow \frac{1}{3}\pi r^2 h = 9856cm^2$

$\Rightarrow \left[\frac{1}{3} \times 3.14 \times 7 \times 7 \times h\right] cm^2 = 9856\, cm^2$

$h = 48cm.$

Thus the height of the cone is $48cm.$

(ii) Slant height (l) of cone $= \sqrt{r^2 + h^2}$

$= \left(\sqrt{(14)^2 + (48)^2} cm\right.$

$= \sqrt{196 + 2304} = \sqrt{2500} cm$

$= 50cm$

Thus, the slant height of cone is 50cm.

(iii) CSA of cone $= \pi r l = \left(\frac{22}{7} \times 14 \times 50\right) cm^2$

$= 2200cm^2.$

14. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilo litres?

Sol:

Radius (r) of pit $= \frac{3 \cdot 5}{2} m = 1 \cdot 75m.$

Depth (h) of pit = 12m.

Volume of pit $= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times (1 \cdot 75)^2 \times 12$

$= 38 \cdot 5m^3$

$\therefore$ Capacity of the pit $= (38 \cdot 5 \times 1)$ Kilometers

$= 38 \cdot 5$ Kilo liters

15. Monica has a piece of Canvas whose area is 551 m^2. She uses it to have a conical tent made, with a base radius of 7m. Assuming that all the stitching margins and wastage incurred while cutting, amounts to approximately 1 m^2. Find the volume of the tent that can be made with it.

Sol:

Given that,

Area of canvas $= 551m^2$ and area of the canvas lost in wastage is $1m^2$

$\therefore$ area of canvas available for making the tent is $(551 - 1)m^2 = 550m^2.$

SA of tent $= 550m^2$ required $\cdot$ base radius of conical tent $= 7m.$

CSA of tent $= 550m^2$

$\pi rl = 550m^2$

$\Rightarrow \frac{22}{7} \times 7 \times l = 550$

$\Rightarrow l = \frac{550}{22} = 25m$

Now, WKT

$l^2 = r^2 + h^2$

$\Rightarrow (25)^2 - (7)^2 = h^2$

$\Rightarrow h = \sqrt{625 - 49}$

$= \sqrt{576} = 24m$

So, the volume of the conical tent $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times 3 \cdot 14 \times (7 \times 7)(24) m^3 = 1232m^3$.