Chapter 20. Mensuration II

Ex 20.1

Answer 1.

i) Height = 12 cm, radius = 5 cm

$$\text{Curved surface area} = \left(\pi r\sqrt{h^2+r^2}\right)$$

$$= \frac{22}{7} \times 5 \times \sqrt{12^2+5^2}$$
$$= \frac{22}{7} \times 5 \times \sqrt{169}$$
$$= \frac{22}{7} \times 5 \times 13$$
$$= 204.29$$

Curved surface area = 204.29 cm^2

Total surface area = area of circular base + curved surface area

$$= \pi r^2 + \left(\pi r\sqrt{h^2+r^2}\right)$$

$$= \frac{22}{7} \times 5 \times 5 + 204.29$$
$$= 78.57 + 204.29$$
$$= 282.86$$

Total surface area = 282.86 cm^2

$$\text{Volume} = \frac{1}{3} \times (\pi r^2) \times h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12$$
$$= 314.29$$

Volume of the cone = 314.29 cm^3

ii) Height = 15 cm, radius = 8 cm

Curved surface area = $\left(\pi r\sqrt{h^2+r^2}\right)$

$$= \frac{22}{7} \times 8 \times \sqrt{15^2+8^2}$$
$$= \frac{22}{7} \times 8 \times \sqrt{289}$$
$$= \frac{22}{7} \times 8 \times 17$$
$$= 427.43$$

Curved surface area = 427.43 cm^2

Total surface area = area of circular base + curved surface area

$$= \pi r^2 + \left(\pi r\sqrt{h^2+r^2}\right)$$

$$= \frac{22}{7} \times 8 \times 8 + 427.43$$
$$= 201.14 + 427.43$$
$$= 628.57$$

Total surface area = 628.57 cm^2

Volume = $\frac{1}{3} \times (\pi r^2) \times h$

$$= \frac{1}{3} \times \frac{22}{7} \times 8 \times 8 \times 15$$
$$= 1005.71$$

Volume of the cone = 1005.71 cm^3

iv) Height = 8 cm, diameter = 12 cm

Diameter = 12 cm $\Rightarrow$ r=6 cm

Curved surface area = $\left(\pi r\sqrt{h^2+r^2}\right)$

$$= \frac{22}{7} \times 6 \times \sqrt{8^2+6^2}$$
$$= \frac{22}{7} \times 6 \times \sqrt{100}$$
$$= \frac{22}{7} \times 6 \times 10$$
$$= 188.57$$

Curved surface area = 188.57 cm^2

Total surface area = area of circular base + curved surface area

$$= \pi r^2 + \left(\pi r\sqrt{h^2+r^2}\right)$$

$$= \frac{22}{7} \times 6 \times 6 + 188.57$$
$$= 113.14 + 188.57$$
$$= 301.71$$

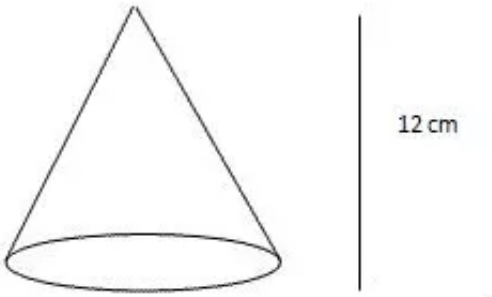
Total surface area = 301.71 cm^2

Volume = $\frac{1}{3} \times (\pi r^2) \times h$

$$= \frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 8$$
$$= 301.71$$

Volume of the cone = 301.71 cm^3

Answer 2.



Volume of the cone $= 154\ cm^3$

$$\Rightarrow \frac{1}{3} \times (\pi r^2) \times h = 154$$

$$\Rightarrow \frac{1}{3} \times (\pi r^2) \times 12 = 154$$

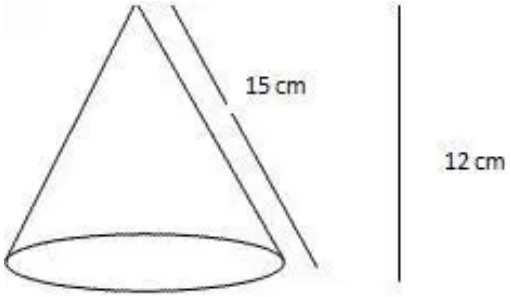
$$\Rightarrow r^2 = \frac{154 \times 3 \times 7}{12 \times 22}$$

$$\Rightarrow r^2 = 12.25$$

$$\Rightarrow r = 3.5 cm$$

Radius of the circular base of the cone is 3.5 cm

Answer 3.



Slant length = l = 15 cm

Height = h = 12 cm

Radius of the base = r

We know,

$$l^2 = h^2 + r^2$$
$$\Rightarrow r^2 = l^2 - h^2$$
$$\Rightarrow r = \sqrt{l^2 - h^2}$$
$$\Rightarrow r = \sqrt{15^2 - 12^2}$$
$$\Rightarrow r = 9\text{cm}$$

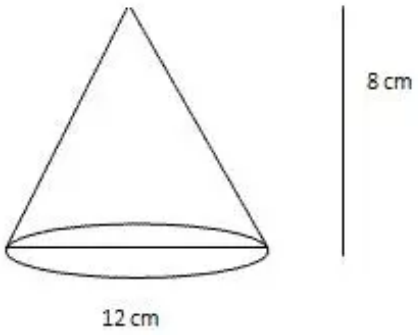
Radius = 9 cm

$$\text{Volume} = \frac{1}{3} \times (\pi r^2) \times h$$

$$= \frac{1}{3} \times 3.14 \times 9 \times 9 \times 12$$
$$= 1017.36\text{cm}^3$$

Volume of the cone = 1017.36 cm^3

Answer 4.



Diameter = 12 cm $\Rightarrow$ r=6 cm

Curved surface area = $\left(\pi r\sqrt{h^2+r^2}\right)$

$$= \frac{22}{7} \times 6 \times \sqrt{8^2+6^2}$$

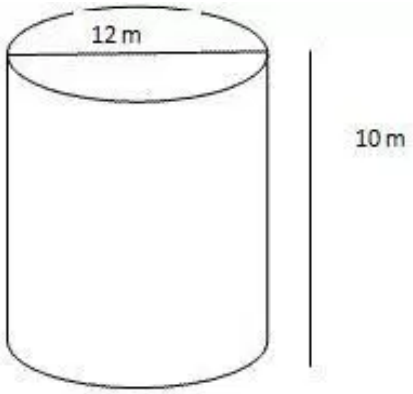
$$= \frac{22}{7} \times 6 \times \sqrt{100}$$

$$= \frac{22}{7} \times 6 \times 10$$

$$= 188.57$$

Curved surface area = 188.57 cm^2

Answer 5.



Diameter of the cylinder = 12 m $\Rightarrow$ radius = 6 m

Curved surface area = circumference of the base x height

$$= 2\pi r \times h$$
$$= 2 \times \frac{22}{7} \times 6 \times 10$$
$$= 377.14 m^2$$

Curved Surface Area = 377.14 m^2

Total surface area = Curved surface area + (2 x base area)

$$= 2\pi rh + 2\pi r^2$$
$$= 2\pi r(h + r)$$
$$= 2 \times \frac{22}{7} \times 6 \times (10 + 6)$$
$$= 2 \times \frac{22}{7} \times 6 \times 16$$
$$= 603.42 m^2$$

Total Surface Area = 603.42 m^2

Answer 6.

Let radius of first cone be 3r and height be h, then radius of second cone will be r and height will be 3h.

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

$$\text{Ratio of volumes of cone} = \frac{\text{Volume of first cone}}{\text{Volume of second cone}}$$

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

$$= \frac{\frac{1}{3} \pi 9r^2 h}{\frac{1}{3} \pi r^2 3h}$$

$$= \frac{3}{1}$$

Ratio of volumes of cone = 3:1

Answer 7.

The base circumferences of the cones are equal, therefore the radius of base are equal.

Let radius be r.

Ratio between slant heights = 5:4

Let slant height of first cone = 5x and of second cone = 4x

Curved surface area of cone = πrl (where l = slant height)

Ratio of curved surface areas =

$$= \frac{\pi r \times 5x}{\pi r \times 4x}$$

$$= \frac{5}{4}$$

Ratio of curved surface areas = 5:4

Answer 8.

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

$$\Rightarrow 75\pi = \frac{1}{3} \times \pi \times 5 \times 5 \times h$$
$$\Rightarrow h = \frac{225}{25}$$
$$\Rightarrow h = 9\text{cm}$$

Height of the cone $= 9$ cm

Answer 9.

Curved surface area $= 710\ \text{cm}^2$

Radius (r) of base $= 11.3$ cm

Let slant height be l.

$$\therefore \pi r l = 710$$
$$\Rightarrow \frac{22}{7} \times 11.3 \times l = 710$$
$$\Rightarrow l = \frac{710 \times 7}{11.3 \times 22}$$
$$\Rightarrow l = 19.99\text{cm} = 20\text{cm}$$

The slant height is 20 cm.

Answer 10.

Curved surface area of the tent = 264 m^2

Slant height (l) = 12 m.

$\Rightarrow \pi rl = 264$

$\Rightarrow \frac{22}{7} \times r \times 12 = 264$

$\Rightarrow r = \frac{264 \times 7}{22 \times 12}$

$\Rightarrow r = 7cm$

Radius of cone = 7 m

Let h be the vertical height.

We know,

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

$\Rightarrow h = \sqrt{l^2 - r^2}$

$\Rightarrow h = \sqrt{12^2 - 7^2}$

$\Rightarrow h = \sqrt{144 - 49} = \sqrt{95}$

$\Rightarrow h = 9.75m$

Vertical height of cone = 9.75 m

Answer 11.

ircular base $=160m^2$

$\pi r^2 = 160$

$\Rightarrow r = \sqrt{\frac{160 \times 7}{22}}$

$\Rightarrow r = \sqrt{50.909} = 7.134m$

Therefore, radius $= 7.134$ m

Capacity or volume of the tent $= 600\ m^3$

$\frac{1}{3}\pi r^2 h = 600$

$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times 7.13 \times 7.13 \times h = 600$

$\Rightarrow h = \frac{600 \times 3 \times 7}{7.13 \times 7.13 \times 22}$

$\Rightarrow h = 11.265m$

Therefore, vertical height $= 11.265$ m

ow slant height (l) =

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

$\Rightarrow l = \sqrt{7.134^2 + 11.265^2}$

$\Rightarrow l = \sqrt{177.624} = 13.327$

Therefore, slant height $= 13.327$ m

The curved surface area =

$\pi rl = \frac{22}{7} \times 7.134 \times 13.327 = 298.9m^2$

Hence, the area of the canvas $= 298.9\ m^2$

Answer 12.

ɪrnal radius of the hollow cylinder = r = 3.5 cm

Height = h = 21 cm

Thickness of the metal = 0.5 cm

Therefore, Outer radius = R = (3.5+0.5) cm = 4 cm

Now, Volume of metal used = $\pi h(R^2 - r^2)$

$$= \frac{22}{7} \times 21 \times (4^2 - 3.5^2)$$
$$= \frac{22}{7} \times 21 \times (16 - 12.25)$$
$$= \frac{22}{7} \times 21 \times 3.75$$
$$= 247.5 cm^3$$

Volume of metal used = 247.5 cm^3

Therefore, Volume of cone = 247.5 cm^3 and height = 7 cm

Let r1 be the radius of cone.

$\therefore$ Volume $= \frac{1}{3}\pi r1^2 h$

$$\Rightarrow \frac{1}{3}\pi r1^2 h = 247.5$$
$$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times r1^2 \times 7 = 247.5$$
$$\Rightarrow r1^2 = \frac{247.5 \times 3 \times 7}{22 \times 7}$$
$$\Rightarrow r1^2 = 33.75$$
$$\Rightarrow r1 = 5.8 cm$$

Radius of the cone = 5.8 cm

Answer 13.

Height of the cylindrical part = H = 8 m

Height of the conical part = h = 4 m

Diameter = 14 m $\Rightarrow$ radius = r = 7 m

Slant height of the cone = l =

$$l = \sqrt{r^2 + h^2}$$
$$l = \sqrt{7^2 + 4^2}$$
$$l = \sqrt{65} = 8.06m$$

Slant height of cone = 8.06 m

Area of the canvas used = Curved surface area of cylinder + curved surface area of cone

$$= 2\pi rH + \pi rl$$
$$= \left(2 \times \frac{22}{7} \times 7 \times 8\right) + \left(\frac{22}{7} \times 7 \times 8.06\right)$$
$$= 352 + 177.32$$
$$= 529.32m^2$$

Area of the canvas used = 529.32 m^2

Answer 14.

Height of the cylinder = h = 5 m

Slant height of the cone = l = 53 m

Diameter = 42 m $\Rightarrow$ radius = r = 21 m

Area of the canvas used = Curved surface area of cylinder + curved surface area of cone

$= 2\pi rh + \pi rl$

$= \left(2 \times \frac{22}{7} \times 21 \times 5\right) + \left(\frac{22}{7} \times 21 \times 53\right)$

$= 660 + 3498$

$= 4158 m^2$

Area of the canvas required = 4158 m^2

Answer 15.

Height of the cylinder = h1 = 32 cm

Radius of bucket = r1 = 18 cm

Height of conical heap = h2 = 24 cm

Let radius of conical heap = r2

Volume of sand in the bucket = volume of sand in conical heap

$\Rightarrow \pi \times r1^2 \times h1 = \frac{1}{3} \times \pi \times r2^2 \times h2$

$\Rightarrow 18 \times 18 \times 32 = \frac{1}{3} \times r2^2 \times 24$

$\Rightarrow r2^2 = \frac{10368 \times 3}{24}$

$\Rightarrow r2^2 = 1296$

$\Rightarrow r2 = 36cm$

Radius of the conical heap = 36 cm

Ex 20.2

Answer 4.

Surface area = volume

$$\Rightarrow 4\pi r^2 = \frac{4}{3}\pi r^3$$
$$\Rightarrow 3r^2 = r^3$$
$$\Rightarrow r = 3$$

Radius of the sphere = 3 units

Answer 5.

Diameter of circle = 2.8 cm $\Rightarrow$ radius = r = 1.4 cm

Area of a circle = πr^2

$$= \pi (1.4)^2$$
$$= 1.96\pi$$

Surface area of sphere = $4\pi r^2$

Given,

Surface area of sphere = Area of the circle

$$\Rightarrow 4\pi r^2 = 1.96\pi$$
$$\Rightarrow r^2 = \frac{1.96}{4}$$
$$\Rightarrow r^2 = 0.49$$
$$\Rightarrow r = 0.7\text{cm}$$

Radius of the sphere = 0.7 cm

Answer 6.

lid sphere = 9 m

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 9 \times 9 \times 9$$

$$= 3054.857 m^3 \ldots\ldots\ldots\ldots (I)$$

Diameter of cylindrical wire = 4 m

Therefore, radius = 2 m

Let length of wire be h

$$\therefore \text{Volume} = \pi r^2 h$$

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

$$= \frac{88h}{7} m^3 \ldots\ldots\ldots\ldots (ii)$$

From (i) and (ii)

$$\Rightarrow \frac{88h}{7} = 3054.857$$

$$\Rightarrow h = \frac{3054.857 \times 7}{88}$$

$$\Rightarrow h = 243m$$

Length of the wire = 243 m

Answer 7.

Radius of sphere = 9 cm

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 9 \times 9 \times 9$$

$$= 3054.857 cm^3 = 30.55 \times 10^{-4} m^3 \ldots\ldots\ldots (I)$$

Diameter of cylindrical wire = 2 mm

Therefore, radius = 1 mm = 0.001 m

Let length of wire be h

$$\therefore \text{Volume} = \pi r^2 h$$

$$= \frac{22}{7} \times 0.001 \times 0.001 \times h$$

$$= 3.142h \times 10^{-6} m^3 \ldots\ldots\ldots\ldots (II)$$

From (I) and (II)

$$\Rightarrow 3.142 \times 10^{-6} h = 30.55 \times 10^{-4}$$

$$\Rightarrow h = \frac{30.55 \times 10^{-4}}{3.142 \times 10^{-6}}$$

$$\Rightarrow h = 972 m$$

Length of the wire =972 m

Answer 8.

Let r be the radii of sphere and cone.

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h \qquad (h = 2r \text{ for sphere})$$

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

But h = 2r for sphere

Therefore, h = 2r for cone also.

Hence, proved.

Answer 9.

Let r, h be the radius and height of Cylinder, Cone and Sphere.

$$\text{Volume of cylinder} = \pi r^2 h$$

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3 \quad (h = 2r \text{ for sphere})$$

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

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

The volume of a cylinder is three times the volume of a cone with equal height and radius. The volume of a sphere is two times the volume of a cone with equal height and radius.

So the ratio of volumes is 3:1:2.

Answer 10.

of spherical marble = 1.4 cm

Therefore, radius = 0.7 cm

Volume of one ball $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \pi \times (0.7)^3 \text{ cm}^3$.....(i)

Diameter of beaker = 7 cm

Therefore, radius = 3.5 cm

Height of water = 5.6 cm

Volume of water $= \pi r^2 h$

$= \pi \times (3.5)^2 \times 5.6 \text{cm}^3$.....(II)

$$\text{No. of balls dropped} = \frac{\text{Volume of water}}{\text{Volume of ball}}$$

$$= \frac{\pi \times (3.5)^2 \times 5.6}{\frac{4}{3} \times \pi \times (0.7)^3}$$

$$= \frac{3 \times (3.5)^2 \times 5.6}{4 \times (0.7)^3}$$

$$= 150$$

No. of balls dropped = 150

Answer 11.

Radius of sphere = 10 cm

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 10 \times 10 \times 10 cm^3$$

$$= 4190.476 cm^3$$

Therefore, volume of water = 4190.476 cm^3

Radius of base of cylinder = 20 cm

Let h be the height of the water

$$\Rightarrow \pi r^2 h = 4190.476$$

$$\Rightarrow \frac{22}{7} \times 20 \times 20 \times h = 4190.476$$

$$\Rightarrow 1257.143h = 4190.476$$

$$\Rightarrow h = 3.33 cm$$

Increase in water level = 3.33 cm

Answer 12.

one = 8 cm

Radius = 5 cm

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

$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 8 cm^3$

$= \frac{4400}{21} cm^3$

Therefore, volume of water that flowed out =

$= \frac{1}{4} \times \frac{4400}{21} cm^3$

$= \frac{1100}{21} cm^3$

Radius of each ball = 0.5 cm = $\frac{1}{2}$ cm

Volume of a ball = $\frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} cm^3$

$= \frac{11}{21} cm^3$

Therefore, No. of balls = $\frac{1100}{21} \div \frac{11}{21} = 100$

Hence, number of lead balls = 100

Answer 13.

Radius = 10 cm

Total surface area = $3\pi r^2$

$$= 3 \times \frac{22}{7} \times 10 \times 10 cm^2$$
$$= 942.86 cm^2$$

Volume of hemisphere = $\frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times 3.14 \times 10 \times 10 \times 10 cm^3$$
$$= 2093.3 cm^3$$

Total surface area = 942.86 cm^2 and volume = 2093.3 cm^3

Answer 14.

Diameter of the hemispherical dome = 10 m

Therefore, radius of dome = 5 m

Curved surface area = $2\pi r^2$

$$= 2 \times \frac{22}{7} \times 5 \times 5$$
$$= 157.14 m^2$$

Cost of painting one sq. metre = Rs. 1.40

Cost of painting 157.14 m^2 = Rs.(1.40 x 157.14)

= Rs. 219.99 = Rs 220

Therefore, cost of painting the dome = Rs 220

Answer 15.

Diameter of the sphere $= 3\frac{1}{3}\text{cm} = \frac{10}{3}\text{cm}$

Therefore, radius $= \frac{5}{3}\text{cm}$

Total curved surface area of each hemisphere $= 3\pi r^2$

$$= 3 \times \frac{22}{7} \times \frac{5}{3} \times \frac{5}{3}$$
$$= 26.19\text{cm}^2$$

Total curved surface area of each hemisphere $= 26.19\ \text{cm}^2$

Answer 16.

diameter of the room = height of the hall $\Rightarrow 2r = h$

Volume of the hall =

But $r = h/2$

$$\Rightarrow \pi\frac{h^2}{4}h + \frac{2}{3}\pi\frac{h^3}{8} = 5236$$

$$\Rightarrow \pi\frac{h^3}{4} + \frac{2}{24}\pi h^3 = 5236$$

$$\Rightarrow \pi h^3\left(\frac{1}{4} + \frac{2}{24}\right) = 5236$$

$$\Rightarrow \pi h^3 = \frac{5236 \times 24}{8}$$

$$\Rightarrow h^3 = \frac{5236 \times 24 \times 7}{8 \times 22}$$

$$\Rightarrow h^3 = 4998$$

$$\Rightarrow h = 17.09\text{m}$$

Height of the hall = 17.09 m

Answer 17.

Inner diameter = 8 cm

Inner radius = r = 4 cm

Outer radius = R = 4cm + 1cm thick material = 5 cm

Volume of hemisphere = $\frac{2}{3}\pi r^3$

Required Volume = $\frac{4}{3}\pi(R^3 - r^3)$

$$= \frac{4}{3} \times \frac{22}{7} \times (5^3 - 4^3)$$
$$= \frac{4}{3} \times \frac{22}{7} \times 61$$
$$= 255.6 cm^3$$

Required volume = 255.6 cm^3

Answer 18.

diameter = 8 cm

Therefore, Radius (R) = 4 cm

Internal diameter = 4 cm

Therefore, Radius (r) = 2 cm

Volume of metal used = $\frac{4}{3}\pi(R^3 - r^3)$

$$= \frac{4}{3} \times \frac{22}{7} \times (4^3 - 2^3)$$
$$= \frac{4}{3} \times \frac{22}{7} \times 56$$
$$= 234.66 cm^3 \ldots\ldots\ldots\ldots (i)$$

Diameter of the cone = 8 cm

Therefore, radius = 4 cm

Let height of the cone = h

Volume = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 4 \times 4 \times h = \frac{352h}{21} \ldots\ldots (ii)$

From (i) and (ii)

$$\Rightarrow \frac{352h}{21} = 234.66$$
$$\Rightarrow 352h = 4927.86$$
$$\Rightarrow h = 13.99 cm = 14 cm$$

The height of the cone = 14 cm

Answer 19.

External diameter of hollow sphere = 12 cm

External radius = R = 6 cm

Internal diameter of hollow sphere = (12 -4) cm = 8 cm

Internal radius = r = 4 cm

Volume of metal used = $\frac{4}{3}\pi(R^3 - r^3)$

$$= \frac{4}{3} \times \frac{22}{7} \times (6^3 - 4^3)$$
$$= \frac{4}{3} \times \frac{22}{7} \times 152$$
$$= 636.95 cm^3$$

Volume of metal used = 636.95 cm^3 = volume of solid sphere

$$\Rightarrow \frac{4}{3}\pi r^3 = 636.95$$
$$\Rightarrow \frac{4}{3} \times \frac{22}{7} \times r^3 = 636.95$$
$$\Rightarrow r^3 = \frac{636.95 \times 3 \times 7}{4 \times 22}$$
$$\Rightarrow r^3 = 151.99 = 152$$
$$\Rightarrow r = 5.34 cm$$

Radius of the solid sphere = 5.34 cm

Answer 20.

us of hemispherical part (r) = 3.5 m = $\frac{7}{2}$m

Therefore, Volume of hemisphere = $\frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$$
$$= \frac{539}{6} m^3$$

Volume of conical part = $\frac{2}{3} \times \frac{539}{6} m^3$ (2/3 of hemisphere)

Let height of the cone = h

Then,

$$\frac{1}{3}\pi r^2 h = \frac{2 \times 539}{3 \times 6}$$
$$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times h = \frac{2 \times 539}{3 \times 6}$$
$$\Rightarrow h = \frac{539 \times 2 \times 2 \times 7 \times 3}{3 \times 6 \times 22 \times 7 \times 7}$$
$$\Rightarrow h = \frac{14}{3} m = 4\frac{2}{3} m = 4.67 m$$

Height of the cone = 4.67 m

Surface area of buoy = $2\pi r^2 + \pi rl$

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

$$l = \sqrt{\left(\frac{7}{2}\right)^2 + \left(\frac{14}{3}\right)^2}$$
$$= \sqrt{\frac{49}{4} + \frac{196}{9}} = \sqrt{\frac{1225}{36}} = \frac{35}{6} m$$

Therefore, Surface area =

$$= \left(2 \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}\right) + \left(\frac{22}{7} \times \frac{7}{2} \times \frac{35}{6}\right) m^2$$
$$= \frac{77}{1} + \frac{385}{6} = \frac{847}{6}$$
$$= 141.17 m^2$$

Answer 21.

ıe solid cylinder (r) = 2 cm

Height of cylinder (h) = 45 cm

Volume of cylinder = $\pi r^2 h$

$$= \frac{22}{7} \times 2 \times 2 \times 45$$
$$= \frac{3960}{7} cm^3$$

Diameter of metallic sphere = 6 cm

Therefore, Radius (r1) = 3 cm

Volume of sphere = $\frac{4}{3}\pi(r1)^3$

$$= \frac{4}{3} \times \frac{22}{7} \times 3 \times 3 \times 3$$
$$= \frac{792}{7} cm^3$$

Therefore, No. of spheres = $\frac{3960}{7} \div \frac{792}{7} = 5$

Number of spheres that can be made = 5

Answer 22.

lius of cone =15 cm

Height of cone = 36 cm

Curved surface of the cone = πrl

$l = \sqrt{r^2 + h^2} = \sqrt{15^2 + 36^2} = \sqrt{1521} = 39$

Curved surface of cone = $\frac{22}{7} \times 15 \times 39 = 1838.571 cm^2$

Curved surface of cone = curved surface of sphere

$\Rightarrow 4\pi r^2 = 1838.571$

$\Rightarrow 4 \times \frac{22}{7} \times r^2 = 1838.571$

$\Rightarrow r^2 = \frac{1838.571 \times 7}{4 \times 22}$

$\Rightarrow r^2 = 146.25$

$\Rightarrow r = 12.09 cm$

The radius of the sphere = 12.09 cm