Exercise 13.7 Page No: 233

1. Find the volume of the right circular cone with
(i) radius 6 cm, height 7 cm (ii) radius 3.5 cm, height 12 cm (Assume $\pi = 22/7$)

Solution:

Volume of cone = (1/3) $\pi r^2 h$ cube units
Where r be radius and h be the height of the cone
(i) Radius of cone, r = 6 cm
Height of cone, h = 7 cm
Say, V be the volume of the cone, we have

$V = \frac{1}{3} \times \frac{22}{7} \times 36 \times 7$
$= (12 \cdot 22)$
$= 264$
The volume of the cone is 264 cm^3.

(ii) Radius of cone, r = 3.5 cm
Height of cone, h = 12 cm
Volume of cone = $\frac{1}{3} \times \frac{22}{7} \times (3.5)^2 \times 7 = 154$

The volume of the cone is 154 cm^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 12 cm
(Assume π=22/7)

Solution:
(i) Radius of cone, r = 7 cm
Slant height of cone, l = 25 cm

Height of cone, h = $\sqrt{l^2 - r^2}$
h= $\sqrt{25^2 - 7^2}$
h = $\sqrt{625 - 49}$
or h = 24
Height of the cone is 24 cm
Now,
Volume of cone, V = (1/3) π r^2 h (formula)

V = (1/3 x 22/7 x 7^2 x 24)
= (154 · 8)
= 1232
So the volume of the vessel is 1232 cm^3

Therefore, capacity of the conical vessel = (1232/1000) liters (because 1L = 1000 cm^3)
= 1.232 Liters.

(ii) Height of cone, h = 12 cm
Slant height of cone, l = 13 cm
Radius of cone, r = $\sqrt{l^2 - h^2}$
r= $\sqrt{13^2 - 12^2}$
r = $\sqrt{169 - 144}$

r = 5
Radius of cone is 5 cm.

Now, Volume of cone, V = (1/3) $\pi r^2 h$

V = (1/3 x 22/7 x 52 x 12) cm^3
= 2200/7
Volume of cone is 2200/7 cm^3

Now,
Capacity of the conical vessel = 2200/7000 litres (1L = 1000 cm^3)
= 11/35 litres

3. The height of a cone is 15 cm. If its volume is 1570 cm^3, find the diameter of its base. (Use π =3.14)

Solution:
Height of the cone, h = 15 cm
Volume of cone =1570 cm^3
Let r be the radius of the cone

As we know: Volume of cone, V = (1/3) $\pi r^2 h$
So, (1/3) $\pi r^2 h$ = 1570
1/3 x 3.14 x r^2 x 15 = 1570
r^2 = 100
r = 10
Radius of the base of cone 10 cm.

4. **If the volume of a right circular cone of height 9 cm is 48 π cm^3, find the diameter of its base.**

Solution:

Height of cone, h = 9 cm
Volume of cone = 48π cm^3
Let r be the radius of the cone.
As we know: Volume of cone, V = (1/3) $\pi r^2 h$
So, 1/3 π r^2 (9) = 48 π
r^2 = 16
r= 4
Radius of cone is 4 cm.
So diameter = 2 x Radius = 8
Diameter of base is 8 cm.

5. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kiloliters?
(Assume π = 22/7)

Solution:
Diameter of conical pit = 3.5
Radius of conical pit, r = diameter/ 2 = (3.5/2) m = 1.75 m
Height of pit, h = Depth of pit = 12 m

Volume of cone, V = (1/3) $\pi r^2 h$
V = 1/3 x 22/7 x $(1.75)^2$ x 12 = 38.5
Volume of cone is 38.5 m^3
Hence, capacity of the pit = (38.5 x 1) kiloliters = 38.5 kiloliters.

6. 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
(Assume π=22/7)

Solution:
Volume of a right circular cone = 9856 cm^3
Diameter of the base = 28 cm

(i) Radius of cone, r = (28/2) cm = 14 cm
Let the height of the cone be h
Volume of cone, V = (1/3) $\pi r^2 h$
(1/3) $\pi r^2 h$ = 9856
1/3 x 22/7 x 14 x 14 x h = 9856
h = 48

The height of the cone is 48 cm.

(ii) Slant height of cone, l $= \sqrt{r^2 + h^2}$
l=$\sqrt{14^2 + 48^2} = \sqrt{196 + 2304} = 50$

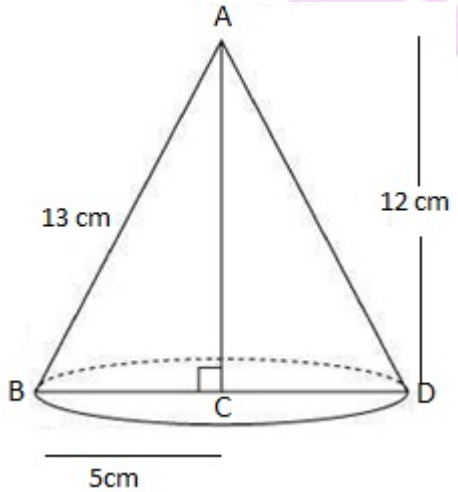
Slant height of the cone is 50 cm.

(iii) curved surface area of cone = π r l
= 22/7 x 14 x 50
= 2200
curved surface area of the cone is 2200 cm^2.

7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.

Solution:

Height (h) = 12 cm
Radius (r) = 5 cm, and
Slant height (l) = 13 cm



Volume of cone, $V = (1/3)\ \pi r^2 h$

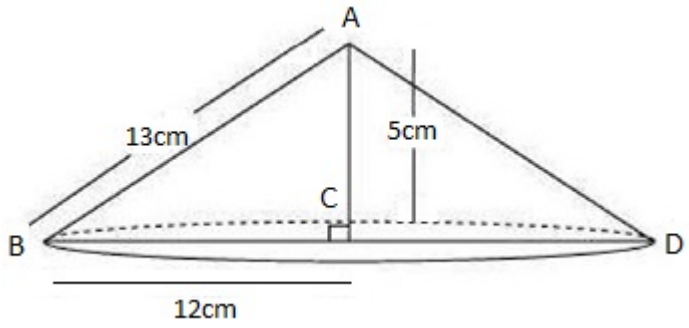
$V = (1/3 \times \pi \times 5^2 \times 12)$

$= 100\pi$

Volume of the cone so formed is $100\pi\ cm^3$.

8. If the triangle ABC in the Question 7 is revolved about the side 5 cm, then find the volume of the solids so obtained. Find also the ratio of the volumes of the two solids obtained in Questions 7 and 8.

Solution:



A right-angled ΔABC is revolved about its side 5 cm, a cone will be formed of radius as 12 cm, height as 5 cm, and slant height as13 cm.

Volume of cone = $(1/3)\ \pi r^2 h$; where r is the radius and h be the height of cone
$= (1/3 \times \pi \times 12 \times 12 \times 5)$
$= 240\ \pi$
The volume of the cones of formed is $240\pi\ cm^3$.
So, required ratio = (result of question 7) / (result of question 8) = $(100\pi) / (240\pi) = 5/12 = 5:12$.

9. A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas. (Assume π = 22/7)

Solution:

Radius (r) of heap = (10.5/2) m = 5.25
Height (h) of heap = 3m
Volume of heap = 1/3 $\pi r^2 h$

= 1/3 x 22/7 x 5.25 x 5.25 x 3
= 86.625
The volume of the heap of wheat is 86.625 m^3.
Again,
Area of canvas required = CSA of cone = πrl, where $l = \sqrt{r^2 + h^2}$
After substituting the values, we have
CSA of cone = $[\frac{22}{7} \times 5.25 \times \sqrt{(5.25)^2 + 3^2}]$
= 22/7 x 5.25 x 6.05
= 99.825
Therefore the area of the canvas is 99.825 m^2 .