

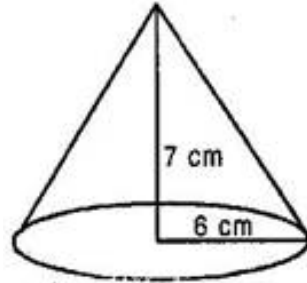


NCERT solutions for class-9 maths surface areas and volumes Ex  
13.7

**Assume  $\pi = \frac{22}{7}$  unless stated otherwise.**

**Q1.** Find the volume of the right circular cone with:

- (i) Radius 6 cm, Height 7 cm
- (ii) Radius 3.5 cm, Height 12 cm



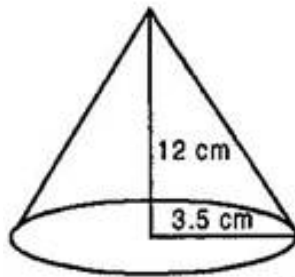
**Ans: (i)** Given:  $r = 6$  cm,  $h = 7$  cm

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

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

$$= 264 \text{ cm}^3$$

**(ii)** Given:  $r = 3.5$  cm,  $h = 12$  cm



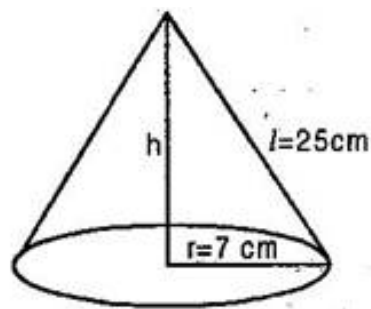
$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12$$

$$= 154 \text{ cm}^3$$

**Q2.** Find the capacity of a conical vessel with:

- (i) Radius 7 cm, Slant height 25 cm
- (ii) Height 12 cm, Slant height 13 cm



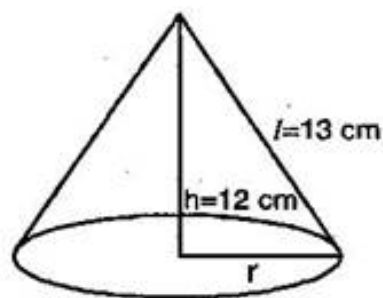
**Ans: (i)** Given:  $r = 7$  cm,  $l = 25$  cm

$$h = \sqrt{l^2 - r^2} = \sqrt{(25)^2 - (7)^2} = \sqrt{625 - 49} = \sqrt{576} = 24 \text{ cm}$$

$$\text{Capacity of conical vessel} = \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24 = 1232 \text{ cm}^3$$

$$= 1.232 \text{ liters } [\because 1000 \text{ cm}^3 = 1 \text{ liter}]$$



**(ii)** Given:  $h = 12$  cm,  $l = 13$  cm

$$r = \sqrt{l^2 - h^2} = \sqrt{(13)^2 - (12)^2}$$

$$= \sqrt{169 - 144}$$

$$= \sqrt{25} = 5 \text{ cm}$$

$$\text{Capacity of conical vessel} = \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12 = \frac{2200}{7} \text{ cm}^3$$

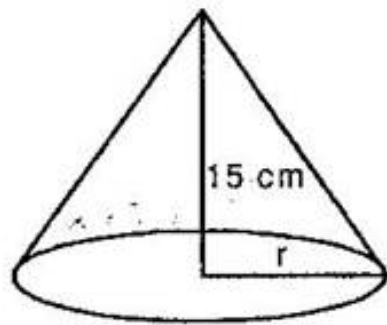
$$= \frac{2200}{7} \times \frac{1}{1000} \text{ liters}$$

$$[\because 1000 \text{ cm}^3 = 1 \text{ liter}]$$

$$= \frac{11}{35} \text{ liter}$$

**Q3.** The height of a cone is 15 cm. If its volume is  $1570 \text{ cm}^3$ , find the radius of the base.  
(Use  $\pi = 3.14$ )

**Ans:** Height of the cone ( $h$ ) = 15 cm



Volume of cone =  $1570 \text{ cm}^3$

$$\Rightarrow \frac{1}{3} \pi r^2 h = 1570$$

$$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times r^2 \times 15 = 1570$$

$$\Rightarrow 15.70 r^2 = 1570$$

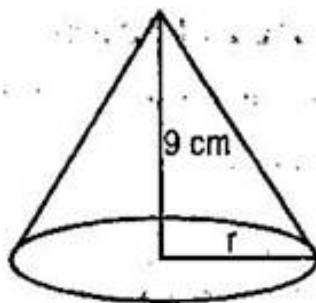
$$\Rightarrow r^2 = 1570 \times \frac{100}{1570} = 100$$

$$\Rightarrow r = 10 \text{ cm}$$

Hence required radius of the base is 10 cm.

**Q4.** If the volume of a right circular cone of height 9 cm is  $48\pi \text{ cm}^3$ , find the diameter of the base.

**Ans:** Height of the cone ( $h$ ) = 9 cm



Volume of cone =  $48\pi \text{ cm}^3$

$$\Rightarrow \frac{1}{3} \pi r^2 h = 48\pi$$

$$\Rightarrow \frac{1}{3} \pi r^2 \times 9 = 48\pi$$

$$\Rightarrow 3r^2 = 48$$

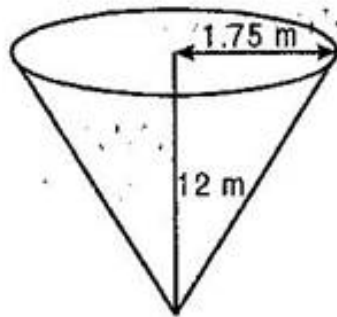
$$\Rightarrow r^2 = \frac{48}{3} = 16$$

$$\Rightarrow r = 4 \text{ cm}$$

$$\therefore \text{Diameter of base} = 2r = 2 \times 4 = 8 \text{ cm}$$

**Q5.** A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kiloliters?

**Ans:** Diameter of pit = 3.5 m



$$\therefore \text{Radius of pit} = \frac{3.5}{2} = 1.75 \text{ m}$$

$$\text{Depth of pit (h)} = 12 \text{ m}$$

$$\text{Capacity of pit} = \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 1.75 \times 1.75 \times 12$$

$$= \frac{1}{3} \times \frac{22}{7} \times \frac{175}{100} \times \frac{175}{100} \times 12$$

$$= \frac{1}{3} \times \frac{22}{7} \times \frac{7}{4} \times \frac{7}{4} \times 12$$

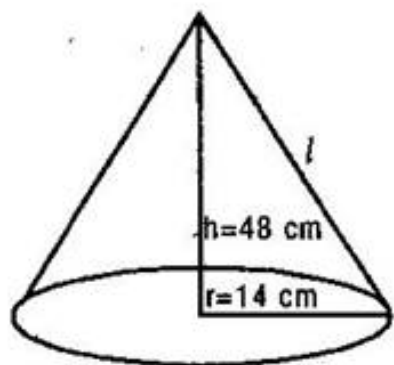
$$= 22 \times \frac{7}{4} = \frac{77}{2} \text{ m}^3 = 35.8 \text{ m}^3$$

$$= 35.8 \text{ kl} [\because 1 \text{ m}^3 = 1 \text{ kl}]$$

**Q6.** The volume of a right circular cone is 9856 cm<sup>3</sup>. If the diameter of the base is 28 cm, find:

- Height of the cone
- Slant height of the cone
- Curved surface area of the cone.

**Ans: (i)** Diameter of cone = 28 cm



$\therefore$  Radius of cone = 14 cm

Volume of cone =  $9856 \text{ cm}^3$

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

$$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times 14 \times 14 \times h = 9856$$

$$\Rightarrow h = \frac{9856 \times 3 \times 7}{22 \times 14 \times 14} = 48 \text{ cm}$$

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

$$= \sqrt{(14)^2 + (48)^2}$$

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

$$= \sqrt{2500} = 50 \text{ cm}$$

(iii) Curved surface area of cone =  $\pi r l$  =

$$\frac{22}{7} \times 14 \times 50 = 2200 \text{ cm}^2$$

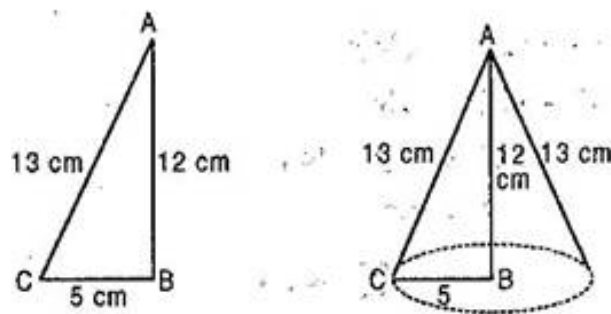
**Q7.** A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.

(Use  $\pi = 3.14$ )

**Ans:** When right angled triangle ABC is revolved about side 12 cm, then the solid formed is a cone.

In that cone, Height ( $h$ ) = 12 cm

And radius ( $r$ ) = 5 cm



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

$$= \frac{1}{3} \pi \times 5 \times 5 \times 12$$

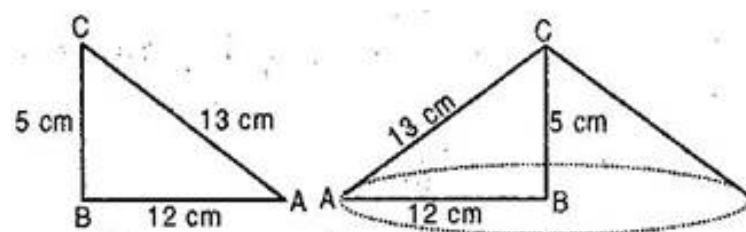
$$= 100\pi \text{ cm}^3$$

**Q8.** If the triangle ABC in question 7 above is revolved about the side 5 cm, then find the volume of the solid so obtained. Find, also, the ratio of the volume of the two solids obtained.

**Ans:** When right angled triangle ABC is revolved about side 5 cm, then the solid formed is a cone.

In that cone, Height ( $h$ ) = 5 cm

And radius ( $r$ ) = 12 cm



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

$$= \frac{1}{3} \pi \times 12 \times 12 \times 5$$

$$= 240\pi \text{ cm}^3$$

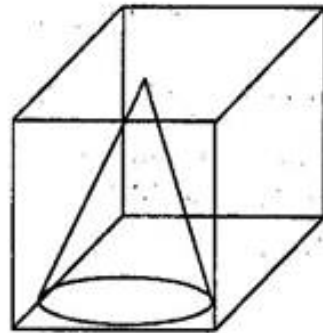
Now,  $\frac{\text{Volume of cone in Q. No. 7}}{\text{Volume of cone in Q. No. 8}}$

$$= \frac{100\pi}{240\pi} = \frac{5}{12}$$

$\therefore$  Required ratio = 5 : 12

**Q9.** Find the volume of the largest right circular cone that can be fitted in a cube whose edge is 14 cm.

**Ans:** Since, diameter of the largest right circular cone that can be fitted in a cube = Edge of cube



$$\Rightarrow 2r = 14 \text{ cm}$$

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

And also Height of the cone ( $h$ ) = Edge of cube = 14 cm

Now, Volume of the largest cone

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

$$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 14$$

$$= \frac{22 \times 7 \times 14}{3}$$

$$= \frac{2156}{3}$$

$$= 718.66 \text{ cm}^3$$

**Q10.** 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 required.

**Ans:** Radius ( $r$ ) of heap

$$= \left( \frac{10.5}{2} \right) \text{ m} = 5.25 \text{ m}$$

Height ( $h$ ) of heap = 3 m

Volume of heap

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



$$= \left( \frac{1}{3} \times \frac{22}{7} \times (5.25)^2 \times 3 \right) \text{ m}^3$$

$$= 86.625 \text{ m}^3$$

Therefore, the volume of the heap of wheat is  $86.625 \text{ m}^3$ .

Area of canvas required = CSA of cone

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

$$= \left[ \frac{22}{7} \times 5.25 \times \sqrt{(5.25)^2 + (3)^2} \right] \text{ m}^2$$

$$= \left( \frac{22}{7} \times 5.25 \times 6.05 \right) \text{ m}^2$$

$$= 99.825 \text{ m}^2$$

Therefore,  $99.825 \text{ m}^2$  canvas will be required to protect the heap from rain.

\*\*\*\*\* END \*\*\*\*\*