

NCERT Solutions for Class 9 Maths Chapter 11 Surface Areas and Volumes Ex 11.7

Question 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

Solution.

(i) Radius (r) = 6 cm

Height (h) = 7 cm

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

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

$$= 12 * 22$$

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

(ii) Radius (r) = 3.5 cm

Height (h) = 12 cm

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

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

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

Question 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

Solution.

(i) Radius (r) = 7 cm

Slant height (l) = 25 cm

$$\text{Height (h)} = \sqrt{25 * 25 - 7 * 7}$$

$$= 24 \text{ cm}$$

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

$$= \frac{1}{3} * \frac{22}{7} * 7 * 7 * 24$$

$$= 154 * 8$$

$$= 1232 \text{ cm}^3$$

$$\text{Capacity of conical vessel} = \left(\frac{1232}{1000}\right) \text{ litres}$$

$$= 1.232 \text{ litres}$$

$$\text{(ii) Height (h)} = 12 \text{ cm}$$

$$\text{Slant height (l)} = 13 \text{ cm}$$

$$\text{Radius (r)} = \sqrt{13 * 13 - 12 * 12}$$

$$= 5 \text{ cm}$$

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

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

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

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

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

Question 3.

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

Solution.

$$\text{Height (h) of cone} = 15 \text{ cm}$$

Let the radius be r

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

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

$$\frac{1}{3} * 3.14 * r * r * 15 = 1570$$

$$r^2 = 100$$

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

Question 4.

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

Solution.

$$\text{Height (h)} = 9 \text{ cm}$$

Let the radius be r

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

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

$$r^2 = 16 \text{ cm}$$

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

$$\text{Diameter} = 2r = 2 * 4$$

$$= 8 \text{ cm}$$

Question 5.

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

Solution.

$$\text{Radius} = 1.75 \text{ m}$$

$$\text{Height (h)} = 12 \text{ m}$$

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

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

$$= 38.5 \text{ m}^3$$

Capacity of the pit = (38.5×1)

= 38.5 kilolitres

Question 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

Solution.

(i) Radius = 14 cm

Let the height be h

Volume = 9856 cm^3

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

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

$$h = 48 \text{ cm}$$

$$(ii) \text{ Slant height } (l) = \sqrt{r * r + h * h}$$

$$= \sqrt{14 * 14 + 48 * 48}$$

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

$$= 50 \text{ cm}$$

$$(iii) \text{ CSA} = \pi r l$$

$$= \frac{22}{7} * 14 * 50$$

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

Question 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

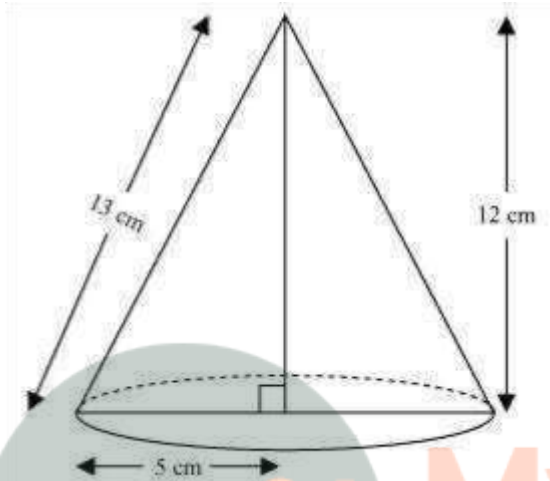
Solution.

When right-angled $\triangle ABC$ is revolved about its side 12 cm then a cone is formed having

Height (h) = 12 cm

Radius (r) = 5 cm

Slant height (l) = 13 cm



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

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

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

Question 8.

If the triangle ABC in the 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 volumes of the two solids obtained in Questions 7 and 8

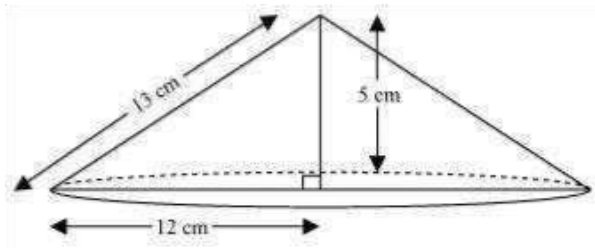
Solution.

When right-angled $\triangle ABC$ is revolved about its side 5 cm a cone will be formed

Radius (r) = 12 cm

Height (h) = 5 cm

Slant height (l) = 13 cm



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

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

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

$$\text{Ratio} = \frac{100\pi}{240\pi}$$

$$= \frac{5}{12} = 5:12$$

Question 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 required

Solution.

$$\text{Radius (r)} = 5.25 \text{ m}$$

$$\text{Height (h)} = 3 \text{ m}$$

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

$$= \frac{1}{3} * \frac{22}{7} * 5.25 * 5.25 * 3$$

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

$$\text{Area of canvas} = \text{CSA of cone}$$

$$= \pi r l$$

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

$$= \frac{22}{7} * 5.25 * \sqrt{5.25^2 + 3^2}$$

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