# CHAPTER 11 SURFACE AREAS AND VOLUMES

## Exercise 11.3 Page No: 147

**1. Find the volume of the right circular cone with**

**(i) radius 6cm, height 7 cm (ii) radius 3.5 cm, height 12 cm (Assume π = 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 the cone, r = 6 cm

Height of the cone, h = 7cm

Ley V be the volume of the cone, so we have

V = (1/3)×(22/7)×36×7

= (12×22)

= 264

The volume of the cone is 264 $cm^3$.

(ii) Radius of the cone, r = 3.5cm

Height of the cone, h = 12cm

Volume of the cone = $(1/3)\times(22/7)\times3.5^2\times7 = 154$

Hence,

The volume of the cone is 154 $cm^3$.

**2. Find the capacity in litres of a conical vessel with**

**(i) radius 7cm, slant height 25 cm (ii) height 12 cm, slant height 13 cm**

**(Assume π = 22/7)**

**Solution:**

(i) Radius of the cone, r =7 cm

Slant height of the cone, l = 25 cm

$$\text{Height of cone, } h = \sqrt{l^2 - r^2}$$
$$h = \sqrt{25^2 - 7^2}$$
$$h = \sqrt{625 - 49}$$

or h = 24

Height of the cone is 24 cm

Now,

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

$V = (1/3)\times(22/7)\times7^2\times24$

$= (154\times8)$

= 1232

So, the volume of the vessel is 1232 $cm^3$

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

= 1.232 Liters.

(ii) Height of the cone, h = 12 cm

Slant height of the cone, l = 13 cm

$$\text{Radius of cone, } r = \sqrt{l^2 - h^2}$$
$$r = \sqrt{13^2 - 12^2}$$
$$r = \sqrt{169 - 144}$$

r = 5

Hence, the radius of the cone is 5 cm.

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

V = (1/3)×(22/7)×52×12 $cm^3$

= 2200/7

Volume of the 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 15cm. If its volume is 1570cm$^3$, 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 the cone, V = (1/3) πr$^2$h

So, (1/3) πr$^2$h = 1570

(1/3)×3.14×r$^2$ ×15 = 1570

r$^2$ = 100

r = 10

Radius of the base of the cone 10 cm.

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

**Solution:**

Height of cone, h = 9cm

Volume of cone =48π cm$^3$

Let r be the radius of the cone.

As we know, volume of the cone, V = (1/3) πr$^2$h

So, 1/3 π $r^2$(9) = 48 π

$r^2$ = 16

r = 4

Radius of the cone is 4 cm.

So, diameter = 2×Radius = 8

Thus, diameter of the base is 8cm.

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

**(Assume π = 22/7)**

**Solution:**

Diameter of conical pit = 3.5 m

Radius of conical pit, r = diameter/ 2 = (3.5/2)m = 1.75m

Height of pit, h = Depth of pit = 12m

Volume of cone, V = (1/3) π$r^2$h

V = (1/3)×(22/7) ×$(1.75)^2$×12 = 38.5

Volume of the cone is 38.5 $m^3$

Hence, capacity of the pit = (38.5×1) kiloliters = 38.5 kiloliters.

**6. The volume of a right circular cone is 9856$cm^3$. If the diameter of the base is 28cm, 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)×(22/7) ×14×14×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 = $\pi r l$

= (22/7)×14×50

= 2200

Curved surface area of the cone is 2200 $cm^2$.

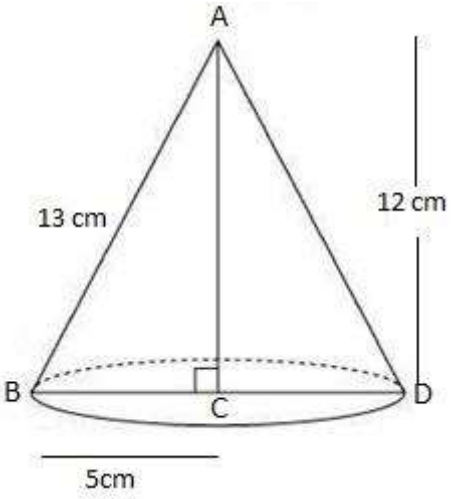
**7. A right triangle ABC with sides 5cm, 12cm and 13cm is revolved about the side 12 cm. Find the volume of the solid so obtained.**

**Solution:**

Height (h)= 12 cm

Radius (r) = 5 cm, and

Slant height (l) = 13 cm




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

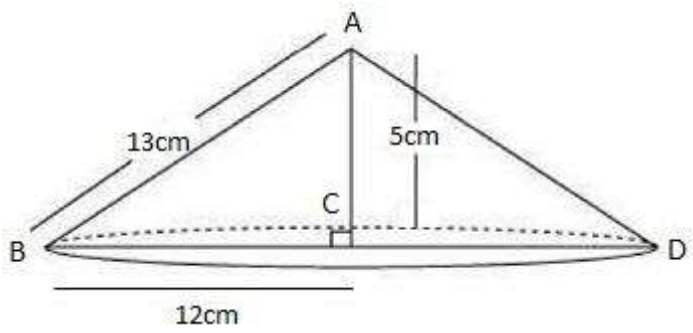
V = (1/3)×π×$5^2$×12

= 100π

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

**8. If the triangle ABC in Question 7 is revolved about the side 5cm, 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 5cm, a cone will be formed of radius as 12 cm, height as 5 cm, and slant height as 13 cm.

Volume of cone = (1/3) $\pi r^2 h$, where r is the radius and h is the height of the cone.

= (1/3)×π×12×12×5

= 240 π

The volume of the cones formed is 240π $cm^3$.

So, the required ratio = (the result of question 7) / (the result of question 8)
= (100π)/(240π) = 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)×(22/7)×5.25×5.25×3

= 86.625

The volume of the heap of wheat is 86.625 $m^3$.

Again,

Area of canvas required= CSA of cone = $\pi rl$, 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)×5.25×6.05

= 99.825

Therefore, the area of the canvas is 99.825 $m^2$.