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CLASS – 9

MATHEMATICS

Chapter – 11

Surface Areas and Volumes

Part – 10

Exercice 11.3 (Question 1 - 5)

Vikas Saini

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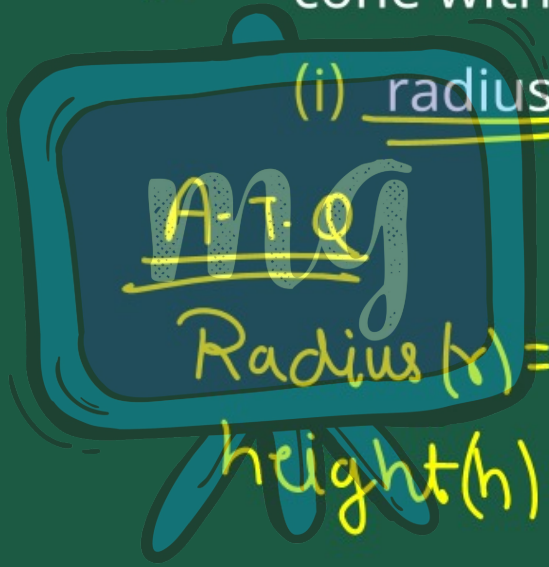
1. Find the volume of the right circular cone with

(i) radius 6 cm, height 7 cm



A.T.Q

Radius (r) = 6 cm

height (h) = 7 cm] → of cone

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Now, we know that

Vol. of cone $= \frac{1}{3} \times \pi \times r^2 \times h$

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

$= 22 \times 2 \times 6$

$= 44 \times 6$

$= 264\ cm^3$

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(ii) radius 3.5 cm, height 12 cm

A.T.Q

Radius = 3.5 cm = $\frac{35}{10} = \frac{7}{2}$

height = 12 cm



Now

Vol. of cone = $\frac{1}{3} \times \pi \times r^2 \times h$

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$$= \frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 6^{2}$$

$$= 11 \times 7 \times 2$$

$$= 11 \times 14$$

$$= 154\ m^3$$

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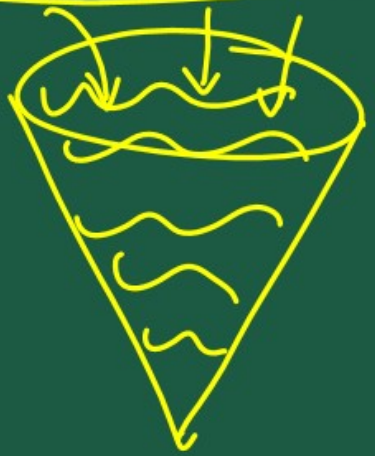
2. Find the capacity in liters of a conical vessel with

(i) radius 7 cm, slant height 25 cm



Ans:

Radius of cone (r) = 7 cm

Slant height of cone (l) = 25 cm

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Now, we know that

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

$$(25)^2 = (7)^2 + h^2$$

$$625 = 49 + h^2$$

$$h^2 = 625 - 49$$

$$h^2 = 576$$

$$h = \sqrt{576} = 24 \text{ cm}$$

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height of cone = 24 cm

Now,

Vol. of cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24^{8}$

$= 22 \times 7 \times 8$

$= 11 \times 2 \times 7 \times 8$

$= 11 \times 2 \times 56 = 11 \times 112 = 1232 \text{ cm}^3$

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Now,

we know that

$1\,m^3 = 1000\,l$

$1\,l = 1000\,cm^3$ / $1\,cm^3 = \frac{1}{1000}\,l$

The Capacity of conical vessel $= 1232\,cm^3$

$= \frac{1232}{1000} = 1.232$ litres

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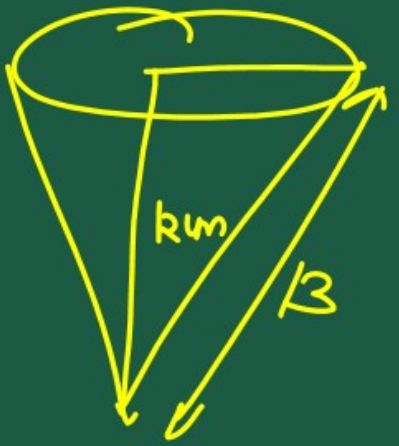
(ii) height 12 cm, slant height 13 cm



A-TQ

height of conical vessel = 12 cm

Slant height of conical vessel = 13 cm

Now,

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

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$$(13)^2 = r^2 + (12)^2$$

$$169 = r^2 + 144$$

$$\Rightarrow r^2 = 169 - 144$$

$$\Rightarrow r^2 = 25$$

$$\Rightarrow r = \sqrt{25}$$

$$\Rightarrow \boxed{r = 5\,cm}$$

So, Radius of Conical Vessel = 5cm

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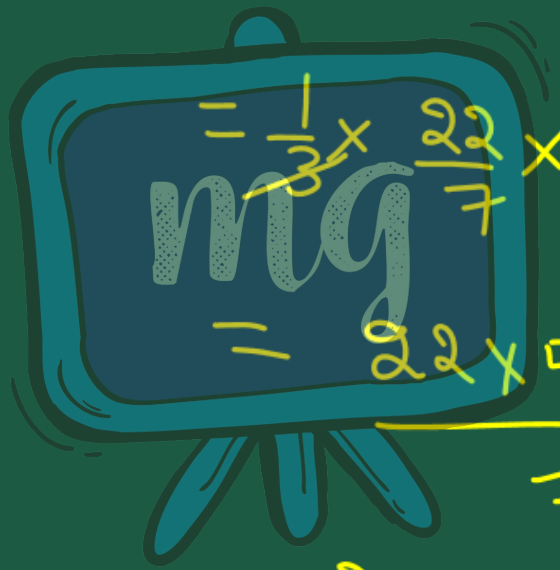
Capacity of conical vessel $= \frac{1}{3} \times \pi \times r^2 \times h$

$(5)^2$

$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12^4$



$= \frac{22 \times 5 \times 5 \times 4}{7}$

$= \frac{22 \times 25 \times 4}{7} = \frac{22 \times 100}{7}$

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$= \frac{22 \times 100}{7} = \frac{2200}{7}\ cm^3$



$1\ m^3 = 1000\ l$

$1\ l = 1000\ cm^3$

$1\ cm^3 = \frac{1}{1000}\ l$

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The capacity of vessel $= \frac{2200}{7}\ cm^3$



$= \frac{\cancel{2200}^{\,11}}{7} \times \frac{1}{\cancel{10000}\ 5}$

$= \frac{11 \times 1}{7 \times 5} = \frac{11}{35}$ litres

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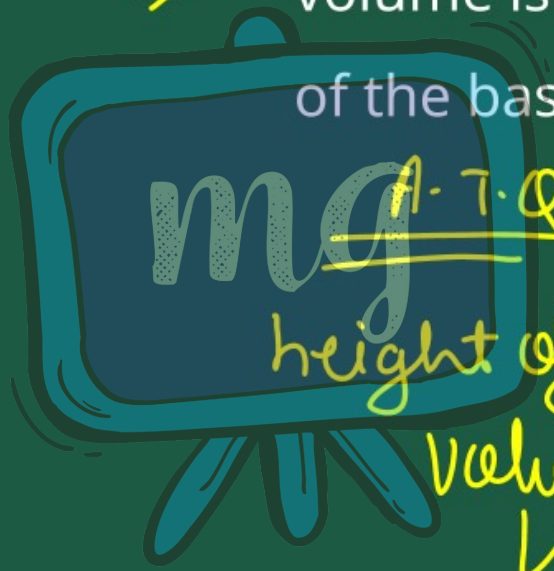
3. The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base. (Use $\pi = 3.14$)



G.T.Q

height of cone = 15 cm

Volume of cone = 1570 cm^3

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Since we know that

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

$$\Rightarrow \frac{1}{3} \times 3.14 \times r^2 \times 15 = 1570$$

$$\Rightarrow \frac{1}{\cancel{3}} \times \frac{314}{100} \times r^2 \times \cancel{15}^{5} = 1570$$

$$\Rightarrow \frac{314 \times 5}{100} \times r^2 = 1570$$

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$$r^2 = \frac{\cancel{15}^{10}\cancel{70} \times 100}{\cancel{314} \times 5}$$

$$r^2 = \frac{19 \times 100}{19}$$

$$r^2 = 100$$

$$r = \sqrt{100} = 10\,cm$$

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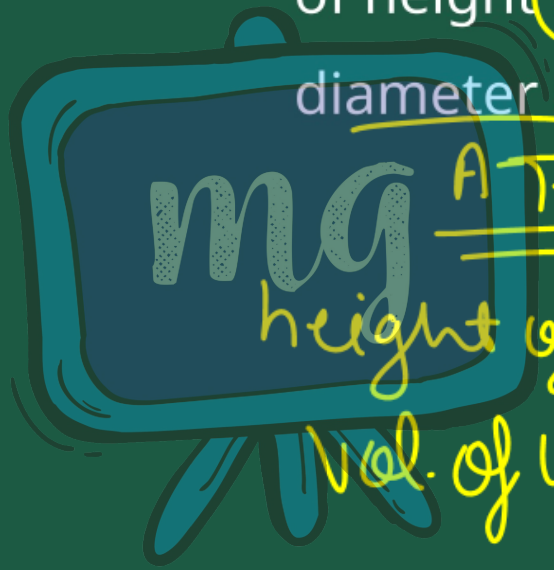
4. If the volume of a right circular cone of height 9 cm is 48π cm^3, find the diameter of its base.



A.T.Q

height of cone = 9 cm

Vol. of cone = 48π cm^2

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Since we know that

Vol. of cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times r^2 \times 9 = 48\pi$

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

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

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

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$\rightarrow r^2 = 16$

$\rightarrow r = \sqrt{16}$

$\rightarrow r = 4\ cm$

Since Radius of base of cone = 4 cm

So diameter = 2 × Radius

$= 2 \times 4 = 8\ cm$

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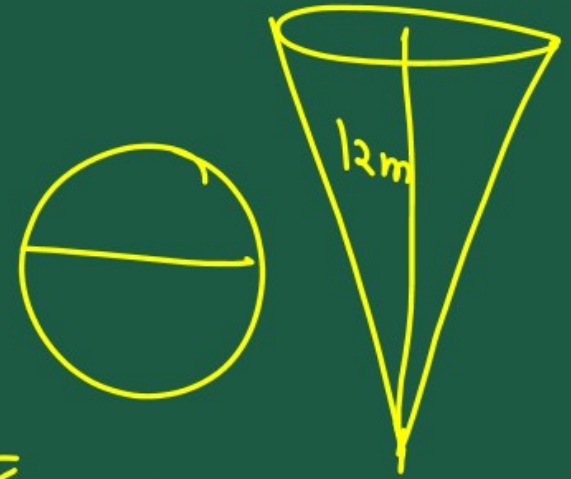
5. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilolitres?



diameter of cone $= 3.5\,m$

$= \frac{35}{10} = \frac{7}{2}\,m$

depth of cone $= 12\,m.$

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So

Radius of conical pit $= \frac{1}{2} \times D$

$= \frac{1}{2} \times \frac{7}{2} = \frac{7}{4}$ m

So now,

Volume of conical pit $= \frac{1}{3} \times \pi \times r^2 \times h$

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

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$= \frac{11 \times 7}{2}$

$= \frac{77}{2}\ m^3$

$= 38.5\ m^3$

So, capacity of conical pit = $38.5\ m^3$

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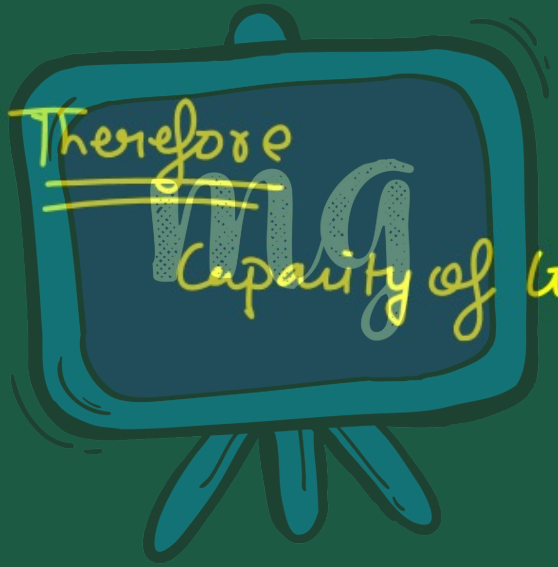
Since

$1\,m^3 = 1000\,l = 1\,kl.$



Therefore

Capacity of conical pit $= 38.5\,m^3$

$= 38.5\,kl$