Assignment 1

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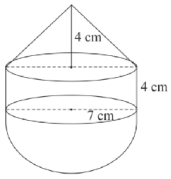
ICSE 2018 QUESTION 9 (C)

(c) The following figure represents a solid consisting of a right circular cylinder with a hemisphere at one end and a cone at the other. Their common radius is 7 cm. The height of the cylinder and cone are each of 4 cm. Find the volume of the solid.



Solution :

The various parameters considered in this problem are listed in Table

Symbol	Value	Description
r	$7cm$	radius of cone, cylinder and hemisphere
h	$4cm$	height of cone and cylinder
$V1$	$\frac{1}{3}\pi r^2 h$	Volume of cone
$V2$	$\pi r^2 h$	Volume of cylinder
$V3$	$\frac{1}{3}\pi r^3$	Volume of hemisphere
V	?	Volume of the figure

From the given information, the volume of the figure is equal to the sum of the volume of the cone, cylinder and hemisphere. Thus,

$V = V1 + V2 + V3$

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

$$\therefore V = \frac{2}{3}\pi r^2 (2h + r)$$

By substituting h and r,

Volume of the figure

$$\begin{aligned} &= \frac{2}{3}49(8+7)\pi \\ &= 490\pi \\ &\approx 1539.38cm^3 \end{aligned}$$