Assignment 1

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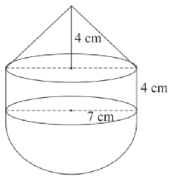
ICSE 2018 QUESTION 9 (C)

(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 :

Here,
Radius of cone = Radius of cylinder = Radius of hemisphere = $7cm$
Height of cone = Height of cylinder = $4cm$
Volume of the figure = Volume of cone + Volume of cylinder + Volume of hemisphere

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

$$\text{Volume of cylinder} = \pi \times r^2 \times h \quad (2)$$

$$\text{Volume of hemisphere} = \frac{2}{3} \times \pi \times r^3 \quad (3)$$

$\therefore$From the above equations,
Volume of the figure = $\frac{1}{3} \times \pi \times r^2 \times h + \pi \times r^2 \times h + \frac{2}{3} \times \pi \times r^3$
$\implies$ Volume of the figure

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

By substituting h and r,
Volume of the figure

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