

CHAPTER 10

Surface Area and Volume

Volume of a combination of solids:

To calculate the volume of the combinational shapes, we have to first figure out the different solid shapes involved to form the combinational shape. After that, the volume of the combinational solid can be calculated by calculating the volume of the specific shapes through, which new combinational shape is formed and add them, to give the required volume.

Example:

A container is in the form of a cylinder mounted on a hemisphere is used to store rice. The diameter of the hemisphere is 21 cm. If total height of the vessel is 18.5 cm, then find the volume of rice stored in it.

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Given,

Diameter of hemisphere (d) = 21 cm

Radius of hemisphere (r) = Radius of cylinder = $\frac{21}{2}$ cm

Total height of vessel = 18.5 cm

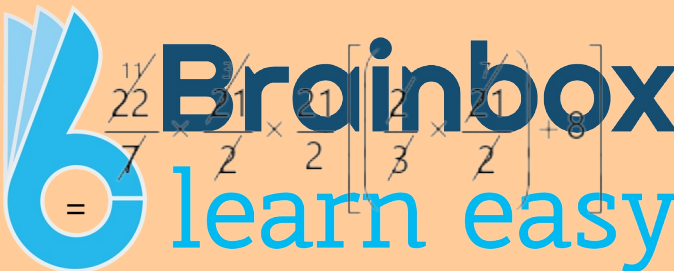
$$\text{Height of cylinder (h)} = 18.5 - \frac{21}{2} = \frac{16}{2} = 8 \text{ cm}$$

Volume of rice stored in container

= Volume of hemisphere + Volume of cylinder

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

$$= \pi r^2 \left[\frac{2}{3} r + h \right]$$



$$= \frac{11 \times 3 \times 21}{2} [7 + 8]$$

$$= \frac{10395}{2}$$

$$= 5197.5 \text{ cm}^3$$

Note:

In calculating the surface area of combination of solids, we cannot add the surface areas of the two solids because some

part of the surface areas disappears in the process of joining them. However, this will not be the case when we calculate the volume. The volume of the solid formed by joining two basic solids will actually be the sum of the volumes of the constituents as seen in the example above.

