



Surface Areas and Volumes Ex.16.2 Q26

Therefore,

$$= 6(a)^2 - \pi r^2 + 2\pi r^2$$

$$= 6a^2 + \pi r^2$$

Put the values to get the remaining surface area of the box,

$$= \left[6(441) + \frac{22}{7} \left(\frac{21}{2} \right)^2 \right] \text{ cm}^2$$

$$= \boxed{2992.5 \text{ cm}^2}$$

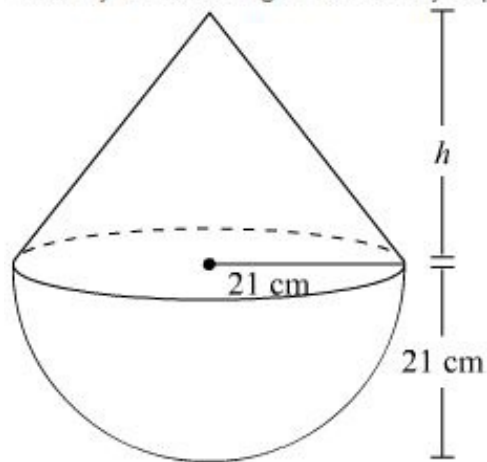
Answer :

Solution:

Let the height of the conical part be h .

Radius of the cone = Radius of the hemisphere = $r = 21 \text{ cm}$

The toy can be diagrammatically represented as



$$\text{Volume of the cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of the hemisphere} = \frac{2}{3} \pi r^3$$

According to given information:

$$\text{Volume of the cone} = \frac{2}{3} \cdot \text{Volume of the hemisphere}$$

$$\therefore \frac{1}{3}\pi r^2 h = \frac{2}{3} \times \frac{2}{3}\pi r^3$$

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

$$\Rightarrow h = \frac{4}{3}r$$

$$\therefore h = \frac{4}{3} \times 21 \text{ cm} = 28 \text{ cm}$$

Thus, surface area of the toy = Curved surface area of cone + Curved surface area of hemisphere

$$= \pi r l + 2\pi r^2$$

$$= \pi r \sqrt{h^2 + r^2} + 2\pi r^2$$

$$= \pi r (\sqrt{h^2 + r^2} + 2r)$$

$$= \frac{22}{7} \times 21 \text{ cm} (\sqrt{(28 \text{ cm})^2 + (21 \text{ cm})^2} + 2 \times 21 \text{ cm})$$

$$= 66(\sqrt{784 + 441} + 42) \text{ cm}^2$$

$$= 66(\sqrt{1225} + 42) \text{ cm}^2$$

$$= 66(35 + 42) \text{ cm}^2$$

$$= 66 \times 77 \text{ cm}^2$$

$$= 5082 \text{ cm}^2$$

Surface Areas and Volumes Ex.16.2 Q27

Answer :

Height of cone = 9.5 – 3.5 = 6 cm

Volume of the solid = Volume of cone + Volume of hemisphere

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

$$= \frac{1}{3} \times \frac{22}{7} \times (3.5)^2 \times 6 + \frac{2}{3} \times \frac{22}{7} \times (3.5)^3$$

$$= 77 + 89.83$$

$$= 166.83 \text{ cm}^3$$

Surface Areas and Volumes Ex.16.2 Q28

Answer :

Volume of wood in the toy = Volume of cylinder – 2(Volume of hemisphere)

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

$$= \frac{22}{7} \times (3.5)^2 \times 10 - 2 \times \frac{2}{3} \times \frac{22}{7} \times (3.5)^3$$

$$= 385 - 179.67$$

$$= 205.33 \text{ cm}^3$$

***** END *****