Surface Areas and Volumes Ex.16.2 Q22

Answer:

We have to find the remaining volume of the cylinder when the toy is inserted into it. The toy is a hemisphere surmounted by a cone.

Radius of cone, cylinder and hemisphere $(r) = 2$ cm

Height of cone $(l) = 2$ cm

Height of the cylinder $(h) = 4$ cm

So the remaining volume of the cylinder when the toy is inserted into it,

$$= \pi r^2 h - \left(\frac{1}{3}\pi r^2 l + \frac{2}{3}\pi r^3 \right)$$

Put the values to get,

$$= 16\pi - \left(\frac{8\pi}{3} + \frac{16\pi}{3} \right)$$

$$= 16\pi - 8\pi$$

$$= \boxed{8\pi}$$

Surface Areas and Volumes Ex.16.2 Q23

Answer:

We have to find the remaining volume of water left in the cylinder when the solid is inserted into it. The solid is a hemisphere surmounted by a cone.

Radius of cone, cylinder and hemisphere $(r) = 60$ cm

Height of cone $(l) = 120$ cm

Height of the cylinder $(h) = 180$ cm

So the remaining volume of water left in the cylinder when the solid is inserted into it,

$$= \pi r^2 h - \left(\frac{1}{3}\pi r^2 l + \frac{2}{3}\pi r^3 \right)$$

$$= \pi r^2 \left(h - \frac{1}{3}l - \frac{2}{3}r \right)$$

Put the values to get,

$$= \left(\frac{22}{7} \right)(3600)(180 - 40 - 40) \ \text{m}^3$$

$$= \boxed{1.131 \ \text{m}^3}$$

Surface Areas and Volumes Ex.16.2 Q24

Answer:

We have a cylindrical vessel in which a cone is inserted. We have,

Radius of the cylinder $(r_1) = 5$ cm

Radius of cone $(r_2) = 3.5$ cm

Height of cylinder $(h) = 10.5$ cm

Height of cone $(l) = 6$ cm

(i) We have to find the volume of water displaced from the cylinder when cone is inserted.
So,

Volume of water displaced = Volume of cone

So volume of water displaced,

$$= \frac{1}{3}\pi r_2^2 l$$

$$= \frac{1}{3}\left(\frac{22}{7} \right)(12.25)(6) \ \text{cm}^3$$

$$= \boxed{77 \ \text{cm}^3}$$

(ii) We have to find the volume of water remaining in the cylinder.

Volume of water left = Volume of cylinder − Volume of cone

So volume of the water left in the cylinder,

$$= \left[\left(\frac{22}{7}(25)(10.5) \right) - (77) \right] \ \text{cm}^3$$

$$= (825 - 77) \ \text{cm}^3$$

$$= \boxed{748 \ \text{cm}^3}$$

Surface Areas and Volumes Ex.16.2 Q25

Answer :

We have to find the remaining volume and surface area of a cubical box when a hemisphere is cut out from it.

Edge length of cube $(a) = 21$ cm

Radius of hemisphere $(r) = 10.5$ cm

Therefore volume of the remaining block,

$=$ Volume of box $-$ Volume of hemisphere

So,

$$= (a)^3 - \frac{2}{3}\pi r^3$$

$$= (21)^3 - \frac{2}{3}\left(\frac{22}{7}\right)\left(\frac{21}{2}\right)^3$$

$$= (9261 - 2425.5) \text{ cm}^3$$

$$= \boxed{6835.5 \text{ cm}^3}$$

So, remaining surface area of the box,

$=$ Surface area of box $-$ Area of base of hemisphere

$\quad +$ Curved surface area of hemsphere

********** END *********