

Task

①

Given radius = 1 m
height = 2 m

$$\begin{aligned}\text{Volume} &= \pi r^2 h \\ &= \pi (1)^2 \times 2 \\ &= 2\pi\end{aligned}$$

②

$l = 30 \text{ m}$; $b = 5 \text{ m}$; $h = 2 \text{ m}$

$$\begin{aligned}\text{Volume of cuboid} &= l b h \\ &= 30 \times 5 \times 2 \\ &= 300 \text{ m}^3\end{aligned}$$

③

$h = 2 \text{ m}$; Volume = $50\pi \text{ m}^3$

$$\begin{aligned}\text{Volume of cylinder } V &= \pi r^2 h \\ \Rightarrow \frac{25}{50}\pi &= \pi r^2 (\cancel{2}) \\ \Rightarrow r^2 &= 25 \\ \Rightarrow r &= 5 \text{ m}\end{aligned}$$

④

Given $l = 4 \text{ m}$, $b = 6 \text{ m}$; $h = x \text{ m}$

$$\begin{aligned}\text{Volume} &= 48 \\ \Rightarrow l b h &= 48 \\ \Rightarrow 4 \times 6 \times h &= 48 \\ \Rightarrow h &= 2 \text{ m} \\ \therefore x &= 2 \text{ m}\end{aligned}$$

⑤

$$\begin{aligned}h_1 &= 6 \text{ m} \quad ; \quad r_1 = 2 \text{ m} \\ h_2 &= \frac{h_1}{2} \quad ; \quad r_2 = 2r_1 = 4 \text{ m} \\ &= 3 \text{ m} \\ \text{change in volume} &= V_2 - V_1 \\ &= \pi r_2^2 h_2 - \pi r_1^2 h_1 \\ &\Rightarrow \pi (r_2^2 h_2 - r_1^2 h_1) \\ &\Rightarrow \pi (4^2 \times 3 - 2^2 \times 6) \\ &= \pi (48 - 24) \\ &= 24\pi\end{aligned}$$

⑥

$$\begin{aligned}\frac{V_1}{V_2} &= \frac{27}{1} \\ \therefore \frac{\frac{4\pi}{3} r_1^3}{\frac{4\pi}{3} r_2^3} &= \frac{27}{1} \\ \Rightarrow \left(\frac{r_1}{r_2}\right)^3 &= \left[\frac{3}{1}\right]^3 \\ \Rightarrow \frac{r_1}{r_2} &= \frac{3}{1}\end{aligned}$$

(7)

$$\text{height} = 2 \text{ m}$$

$$\text{Area} = 5 \text{ m}^2$$

$$\begin{aligned} \text{volume} &= \pi r^2 h \\ &= \text{Area} \times h \\ &= 5 \times 2 \\ &= 10 \text{ m}^3 \end{aligned}$$

(8)

$$r_1 = 2 \text{ m} ; r_2 = 4 \text{ m} ; h_1 = h_2$$

$$\frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \left[\frac{r_1}{r_2} \right]^2$$

$$\frac{V_1}{V_2} = \left[\frac{2}{4} \right]^2 = \frac{1}{4}$$

(9)

$$\frac{V_1}{V_2} = \frac{2}{1} ; r_1 = r_2$$

$$\therefore \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{2}{1}$$

$$\Rightarrow \frac{h_1}{h_2} = \frac{2}{1}$$

(10)

$$\text{volume} = 660 \text{ cm}^3 ; h = 35 \text{ cm}$$

$$\therefore \text{volume} = \pi r^2 h$$

$$\Rightarrow 660 = \frac{22}{7} r^2 \times 35$$

$$\Rightarrow 30 = 5 r^2$$

$$\Rightarrow r = \sqrt{6} \text{ cm}$$

(11)

$$\text{Diagonal of cube} = \sqrt{3} a$$

'a' is side of cube

$$\begin{aligned} \text{Volume of cube} &= (\text{side})^3 \\ &= \text{Product of three sides} \end{aligned}$$

(12)

$$\text{volume of cylinder} = \text{Area} \times \text{height}$$

(14)

$$r_1 = 2 \text{ m} ; r_2 = 1 \text{ m}$$

$$h_1 = h_2 = 4 \text{ m}$$

$$\begin{aligned} V_1 - V_2 &= \pi r_1^2 h_1 - \pi r_2^2 h_2 \\ &= \pi [2^2 \times 4 - 1^2 \times 4] \\ &= \pi [16 - 4] = 12\pi \end{aligned}$$

(13)

If 'd' is diagonal of cube

$$\text{then volume} = \frac{\sqrt{3}}{4} d^3$$

$$\text{volume of sphere} = \frac{4\pi}{3} r^3 ; \text{cube} = (\text{side})^3$$

(2)

(15)

$$r_1 = 3 \text{ m}; \quad r_2 = 1 \text{ m}$$

$$\Delta V = \frac{4\pi}{3} [r_1^3 - r_2^3]$$

$$= \frac{4\pi}{3} [3^3 - 1^3]$$

$$= \frac{4\pi}{3} (27 - 1)$$

$$= 26 \times \frac{4\pi}{3}$$

$$= \frac{104}{3} \pi$$

(18)

$$\text{Area} = 20 \text{ m}^2$$

$$h = 10 \text{ m}$$

$$\text{volume} = \text{Area} \times h$$

$$= 20 \times 10$$

$$= 200 \text{ m}^3$$

L Task
SAA's

(1)

$$\text{Volume} = 20 \text{ m}^3; \quad r = 2 \text{ m}$$

$$\Rightarrow \pi r^2 h = 20$$

$$\Rightarrow \pi 2^2 h = 20$$

$$\Rightarrow 4\pi h = 20$$

$$\Rightarrow h = \frac{20}{4\pi} = \frac{5}{\pi} \text{ m}$$

(16)

Given.

Volume of cylinder = volume of sphere

$$\Rightarrow \pi r^2 h = \frac{4\pi}{3} r^3$$

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

(17)

$$\text{Side} = 0.5 \text{ m}$$

$$\text{volume of cube} = (\text{side})^3$$

$$= (0.5)^3$$

$$= 125 \times 10^{-3} \text{ m}^3$$

(19)

$$r = 4 \text{ m}; \quad h = 10 \text{ m}$$

$$\text{volume of cylinder} = \pi r^2 h$$

$$= \pi \times (4)^2 \times 10$$

$$= 160 \pi$$

(3)

$$r = 3 \text{ m}$$

$$\text{volume of sphere} = \frac{4\pi}{3} r^3$$

$$= \frac{4\pi}{3} (3)^3$$

$$= 4\pi \times 3^2$$

$$= 36\pi$$

(4)

$$h = 2r : \text{volume} = 16\pi$$

$$\text{volume of cylinder} = \pi r^2 h$$

$$\Rightarrow 16\pi = \pi r^2 (2r)$$

$$\Rightarrow 16\pi = 2\pi r^3$$

$$\Rightarrow 8 = r^3$$

$$\Rightarrow r = 2 \text{ m}$$

(5)

$$\text{Given } a_1 = 2a_2$$

$$\text{volume of cube} = a^3$$

$$\Rightarrow \frac{V_1}{V_2} = \left(\frac{a_1}{a_2}\right)^3$$

$$\Rightarrow \frac{V_1}{V_2} = \left(\frac{2a_2}{a_2}\right)^3$$

$$= \frac{2^3}{1} = \frac{8}{1}$$

(6)

$$\text{volume of sphere} = 16\pi$$

$$\Rightarrow \frac{4\pi}{3} r^3 = 16\pi \times 4$$

$$\Rightarrow r^3 = 4 \times 3$$

$$\Rightarrow r^3 = 12$$

$$\Rightarrow r = \sqrt[3]{12}$$

(7)

$$\text{Diagonal cube} = 3 \text{ m}$$

$$\Rightarrow \sqrt{3} a = 3$$

$$\Rightarrow a = \sqrt{3} \text{ m}$$

(9)

$$\text{Side} = 1 \text{ m}$$

$$\text{diagonal length} = \sqrt{3} \times \text{side}$$

$$= \sqrt{3} \times 1$$

$$= \sqrt{3} \text{ m}$$

$$= (\sqrt{3})^{\frac{1}{3}}$$

(8)

$$\frac{V_1}{V_2} = \left(\frac{r_1}{r_2}\right)^3$$

$$\Rightarrow \frac{8\pi}{2\pi} = \left(\frac{r_1}{r_2}\right)^3$$

$$\Rightarrow \frac{8}{1} = \left(\frac{r_1}{r_2}\right)^3 \Rightarrow \frac{r_1}{r_2} = \frac{2}{1}$$

(10)

⑩ volume of sphere = volume of cylinder

$$\frac{4\pi}{3} r^3 = \pi r^2 h$$

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

$$\Rightarrow 2r = \frac{3}{2}h = 3 \times \frac{10}{2} = 15 \text{ m}$$

⑪

(a) volume of sphere = $\frac{4\pi}{3} r^3$; volume of hemisphere = $\frac{2\pi}{3} r^3$

(b) if $r = 3 \text{ m}$; volume = $\frac{4\pi}{3} (r)^3 = \frac{4\pi}{3} (3)^3 = 36\pi$.

⑬

$$l_1 = 2 \text{ m}, b_1 = 3 \text{ m}, h_1 = 4 \text{ m}$$

$$l_2 = 4 \text{ m}, b_2 = 3 \text{ m}, h_2 = 2 \text{ m}$$

change in volume = $(l_1 b_1 h_1 \sim l_2 b_2 h_2)$

$$= 2 \times 3 \times 4 \sim 4 \times 3 \times 2$$

$$= 0$$

⑭

$$a_1 = 4 \text{ m} ; a_2 = \frac{1}{2} a_1 = 2 \text{ m}$$

$$\frac{v_1}{v_2} = \left[\frac{a_1}{a_2} \right]^3 = \left[\frac{4}{2} \right]^3$$
$$= \frac{8}{1}$$

⑮

$$l = 1 \text{ m}, b = 2 \text{ m}, h = (k+1) \text{ m}$$

$$V = 14 \text{ m}^3$$

$$lbh = 14$$

$$\Rightarrow 1 \times 2 \times (k+1) = 14$$

$$\Rightarrow k+1 = 7$$

$$\Rightarrow k = 6 \text{ m}$$

⑯

$$a_1 = 2 \text{ m}, l = 2 \text{ m}, b = 1 \text{ m}$$

volume of cuboid = volume of cube

$$\Rightarrow lbh = a^3$$

$$\Rightarrow 2 \times 1 \times h = 2^3$$

$$\Rightarrow h = 2^2 = 4 \text{ m}$$

(17)

$$r = 1\text{m}$$

$$\text{Volume of sphere} = \frac{4\pi}{3} r^3$$

$$= 4 \frac{\pi}{3} (1)^3$$

$$= \underline{4} \frac{\pi}{3} \text{m}^3$$