Surface Areas and Volumes Ex.16.1 Q20

Answer :

The radius of the cylindrical tub is 12cm. Upon dropping a spherical ball into the tub, the height of the raised water is 6.75cm. Therefore, the volume of the raised water is

$V = \pi \times (12)^2 \times 6.75 \text{ cm}^3$

Let, the radius of the spherical ball is *r*. Therefore, the volume of the spherical ball is

$V_1 = \frac{4}{3}\pi \times r^3 \text{ cm}^3$

Since, the volume of the raised water is same as the volume of the spherical ball, we have

$V_1 = V$

$\Rightarrow \frac{4}{3}\pi \times r^3 = \pi \times (12)^2 \times 6.75$

$\Rightarrow \quad r^3 = \frac{(12)^2 \times 6.75 \times 3}{4}$

$\Rightarrow \quad = 12 \times 3 \times 6.75 \times 3$

$\Rightarrow \quad = 9$

Therefore, the radius of the spherical ball is $\boxed{9 \text{ cm}}$

Surface Areas and Volumes Ex.16.1 Q21

Answer :

The average displacement of water by a person is 0.04 cubic m. Hence, the total displacement of water in the rectangular tank by 500 persons is $V = 500 \times 0.04 = 20$ Cubic m.

The length and width of the rectangular tank are 80m and 50m respectively. Upon dipping in the tank, let the height of the raised water is be *h* m. Therefore, the volume of the raised water is

$V_1 = 80 \times 50 \times h$

$= 4000h$ cubic m

Since, the volume of the raised water is same as the volume of the water displaced by 500 persons, we have

$V_1 = V$

$\Rightarrow 4000h = 20$

$\Rightarrow \quad h = \frac{20}{4000}$

$\Rightarrow \quad = 0.005$

Therefore, the water will be raised by $\boxed{0.005 \text{ m}}$ or $\boxed{0.5 \text{ cm}}$

Surface Areas and Volumes Ex.16.1 Q22

Answer :

The radius of the cylindrical jar is 6cm. The volume of the oil of height 2cm contained in the jar is

$V = \pi \times (6)^2 \times 2$ cubic cm

The radius of each small sphere is 1.5cm. Therefore, the volume of each small sphere is

$V_1 = \frac{4}{3} \times \pi \times (1.5)^3$ cubic cm

Since, the volume of the raised water is same as the sum of the volumes of the immersed iron spheres, we have the number of immersed sphere is

$\frac{V}{V_1} = \frac{\pi \times (6)^2 \times 2}{\frac{4}{3} \times \pi \times (1.5)^3}$

$= \frac{3 \times 36 \times 2 \times 1000}{4 \times 15 \times 15 \times 15}$

$= 16$

Therefore, the number of iron spheres is $\boxed{16}$

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