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CLASS – 9

MATHEMATICS

Chapter – 11

Surface Areas and Volumes

Part – 13

Exercice 11.4 (Question 1 - 5)

Vikas Saini

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1. Find the volume of a sphere whose radius is

(i) 7 cm



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$$= \frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$$

$$= \frac{4 \times 22 \times 49}{3}$$

$$= \frac{22 \times 4 \times 49}{3} = \frac{196 \times 22}{3}$$

$$= \frac{2 \times 11 \times 196}{3} = \frac{392 \times 11}{3} = \frac{4312}{3}$$

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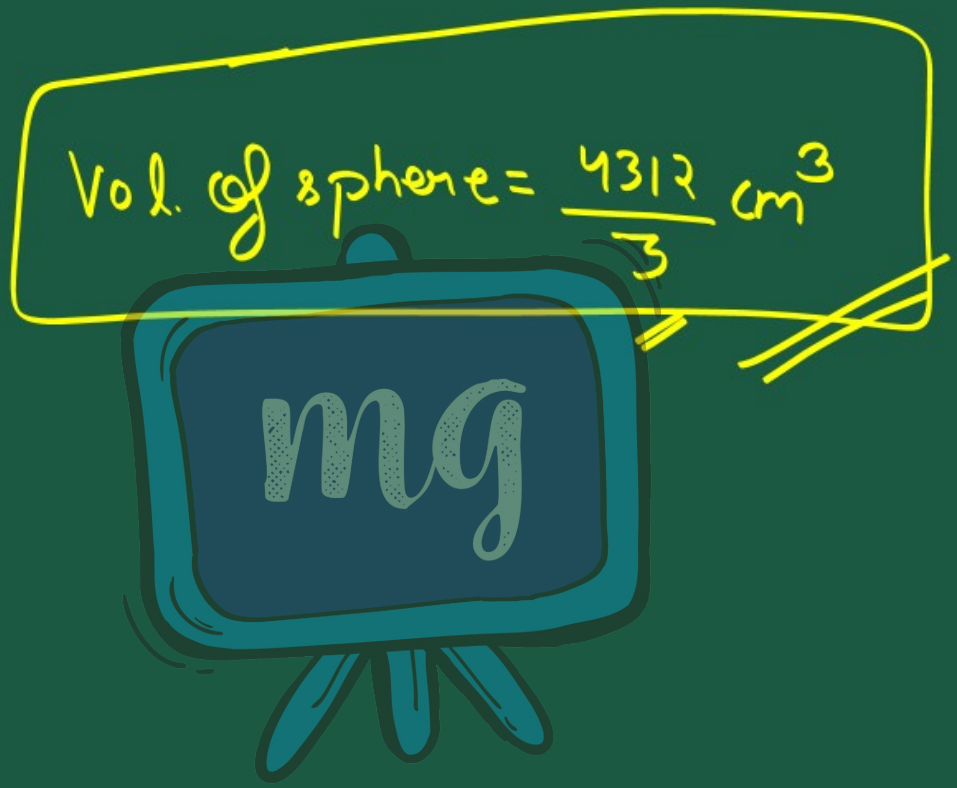

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$= \frac{4}{3}x$



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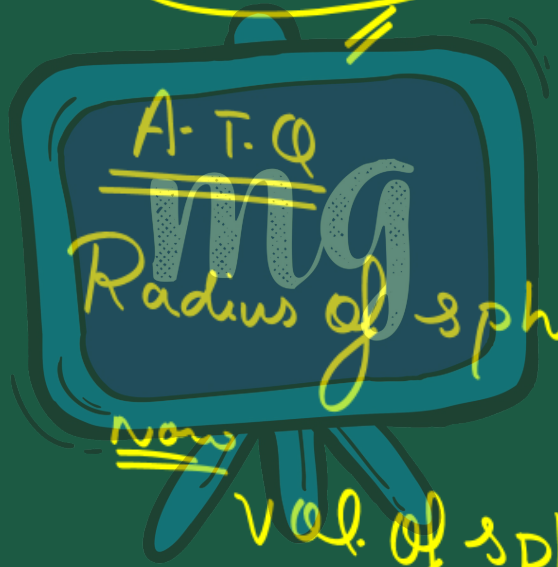
(ii) 0.63 m



A. T. Q

Radius of sphere = 0.63 m

Now

Vol. of sphere = $\frac{4}{3} \times \pi \times r^3$

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$$\text{vol. of sphere} = \frac{4}{3} \times \frac{22}{7} \times 0.63 \times 0.63 \times 0.63$$

$$= \frac{4}{3} \times \frac{22}{7} \times \frac{63}{100} \times \frac{63}{100} \times \frac{63}{100}$$

$$= \frac{4 \times 22 \times 3 \times 63 \times 63}{1000000}$$

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$$= \frac{4 \times 22 \times 3 \times 3969}{1000000}$$

$$= \frac{88 \times 11907}{1000000}$$

$$= \frac{1047816}{1000000} = 1.047816\ m^3$$

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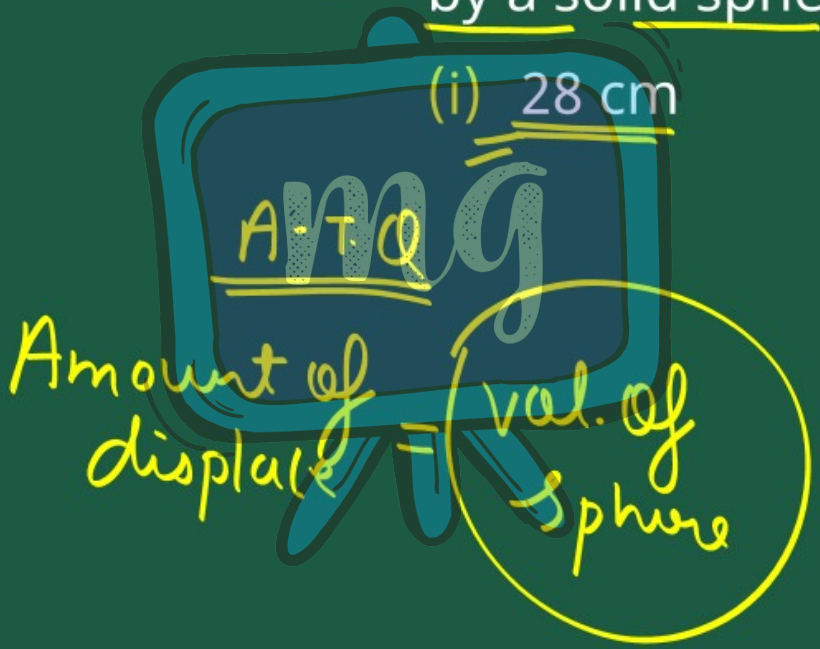
2. Find the amount of water displaced by a solid spherical ball of diameter

(i) 28 cm





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Radius of sphere = $\frac{\text{diameter of sphere}}{2}$

$= \frac{28}{2} = 14\text{ cm}$

Now,

Vol. of sphere $= \frac{4}{3} \times \pi \times r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \cancel{2} \times 7 \times 14 \times 14$

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$$= \frac{4 \times 22 \times 2 \times 14 \times 14}{3}$$

$$= \frac{4 \times 22 \times 2 \times 196}{30}$$

$$= \frac{22 \times 8 \times 196}{3} = \frac{11 \times 2 \times 8 \times 196}{3}$$

$$= \frac{11 \times 16 \times 196}{3} =$$

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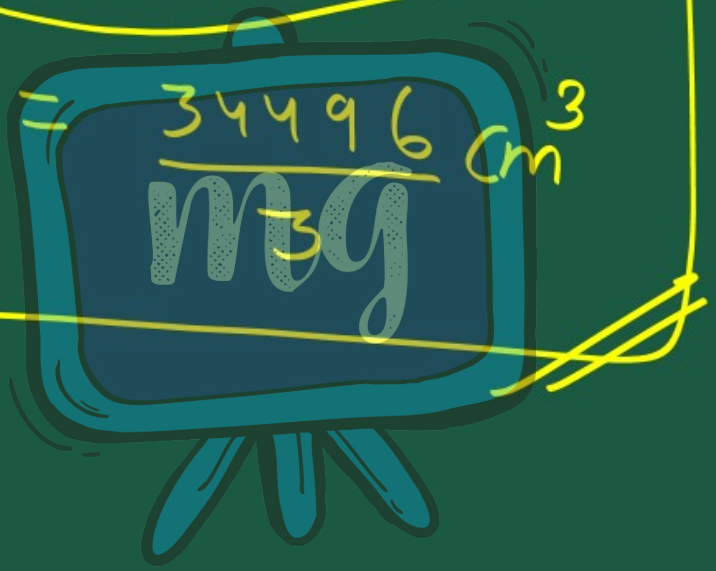
$$= \frac{11 \times 3136}{3}$$

Vol. of sphere $= 34496\ cm^3$



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(ii) 0.21 m

Now

diameter of sphere = 0.21 m

Radius of sphere $= \frac{d}{2} = \frac{0.21}{2} = \frac{21}{2 \times 100}$

Vol. of sphere $= \frac{4}{3} \times \pi \times r^3$

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$$= \frac{\cancel{22}}{\cancel{2}} \times \frac{\cancel{33}}{\cancel{3}} \times \frac{\cancel{21}}{\cancel{21}\times 100} \times \frac{21}{\cancel{21}\times 100} \times \frac{21}{\cancel{21}\times 100}$$

$$= \frac{11 \times 21 \times 21}{100 \times 100 \times 100} = \frac{11 \times 441}{1000000}$$

$$= \frac{4851}{1000000} = 0.004851\,m^3$$

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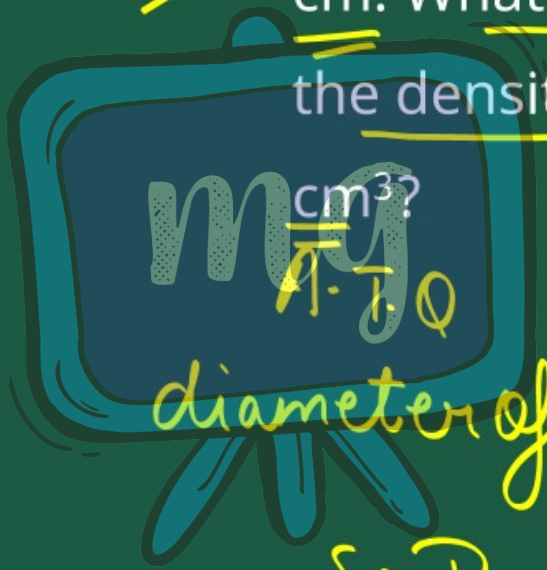
3. The diameter of a metallic ball is 4.2 cm. What is the mass of the ball, if the density of the metal is 8.9 g per cm^3?



diameter of metallic Ball = 4.2 cm

So, Radius = $\frac{d}{2} = \frac{4.2}{2} = 2.1$ cm

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density of metallic = 8.9 g per cm^3

Now, we know that

$$\text{density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Mass} = \text{density} \times \text{Volume}$$

Mass = 8.9 × Vol. of Metallic Ball

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Vol. Of metallic Ball $= \frac{4}{3} \times \pi \times r^3$



$= \frac{4}{3} \times \frac{22}{7} \times 2.1 \times 2.1 \times 2.1$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{21}{10} \times \frac{21}{10} \times \frac{21}{10}$

$= \frac{4 \times 22 \times 21 \times 21}{1000} = \frac{88 \times 441}{1000}$

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$$= \frac{88 \times 44}{1000}$$

$$= \frac{38808}{1000}$$

$$= 38.808 \text{ cm}^3$$

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Now

Mass of metallic Ball = 8.9×38.808

$= 345.3912\ g$



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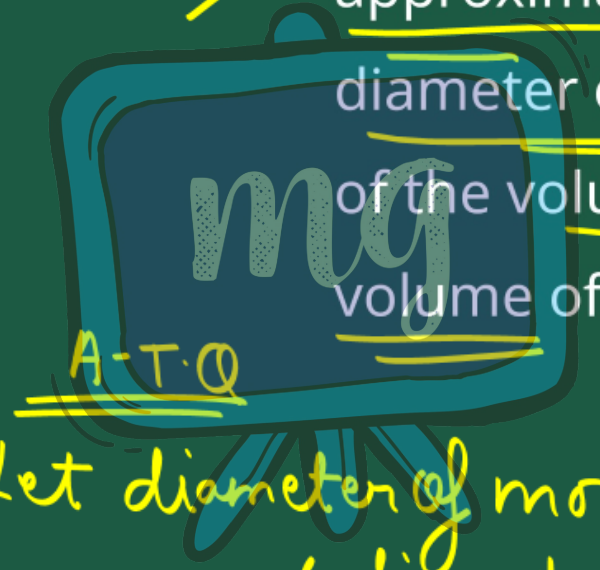
4. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?



A-T-Q

Let diameter of moon be d_m
& diameter of Earth be d_e

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Now

Radius of moon = $\frac{d_m}{2} = r_m \Rightarrow d_m = 2 \times r_m$

Radius of Earth = $\frac{d_e}{2} = r_e \Rightarrow d_e = 2 \times r_e$

Now

diameter of moon = $\frac{1}{4}$ × diameter of Earth

$d_m = \frac{1}{4} \times d_e$

$2 \times r_m = \frac{1}{4} \times 2 r_e$

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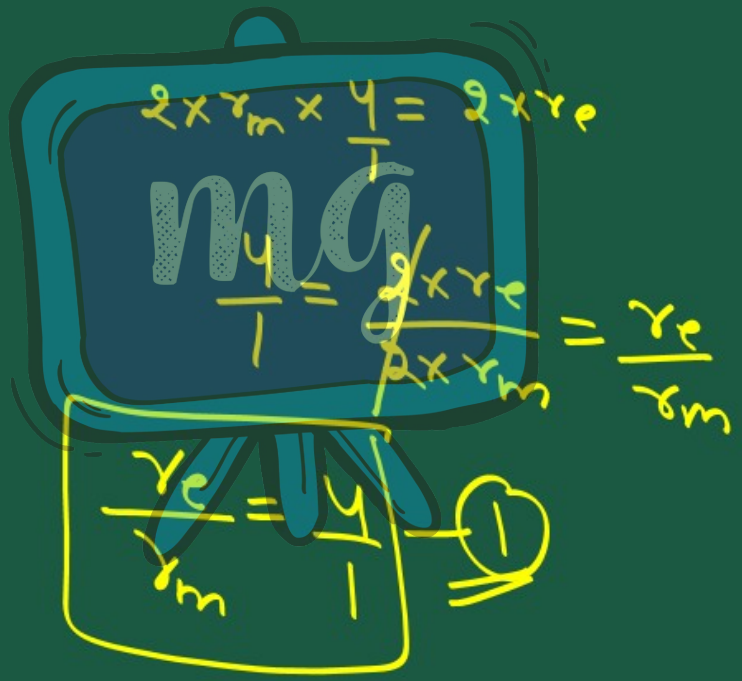
$$2 \times r_m = \frac{1}{4} \times 2r_e$$



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Now

$$\text{fraction} = \frac{\text{Vol. of earth}}{\text{Vol. of moon}}$$

$$= \frac{\frac{4}{3}\times\pi\times r_e^3}{\frac{4}{3}\times\pi\times r_m^3}$$

$$= \frac{r_e^3}{r_m^3} = \left(\frac{r_e}{r_m}\right)^3$$

Vol. of Sphere $= \frac{4}{3}\times\pi\times r^3$

$$\left[\left[\frac{a}{b}\right]^m = \frac{a^m}{b^m}\right]$$

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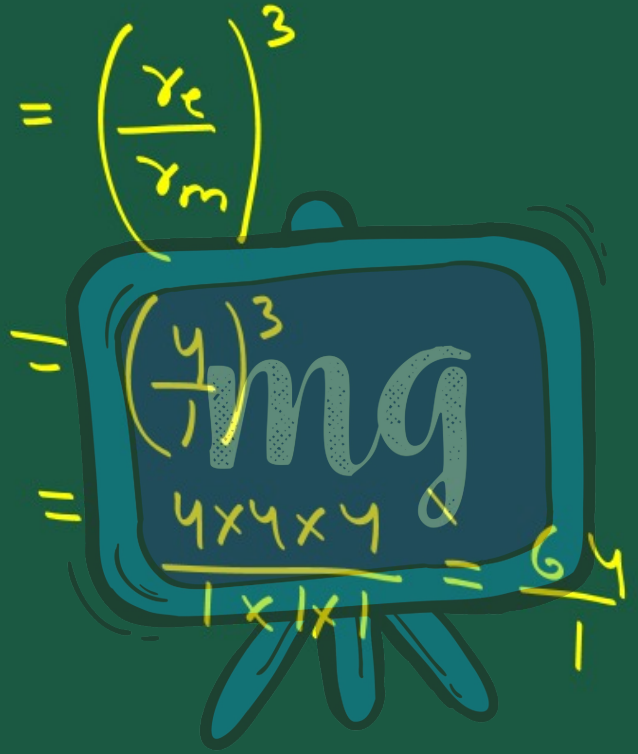

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5. How many litres of milk can a hemispherical bowl of diameter 10.5 cm hold?



Ans

Diameter of Hemispherical Bowl = $10.5 \text{ cm} = \frac{105}{10} = \frac{21}{2}$ cm

So Radius = $\frac{1}{2} \times \frac{21}{2} = \frac{21}{4}$ cm

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Now,

Vol. of Hemispherical Bowl $= \frac{2}{3} \times \pi \times r^3$

$= \frac{2}{3} \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times \frac{21}{2}$

$= \frac{11 \times 21 \times 21}{16} = \frac{11 \times 441}{16} = \frac{4851}{16}$

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Vol. of Hemispherical Bowl $= \frac{4851}{16} cm^3$

$= 303.1875 cm^3$

$= \frac{303.1875}{1000} l$

$= 0.3031875$ litres

$1 l = 1000 cm^3$

$1 cm^3 = \frac{1}{1000} l$