Tarefa Básica - Esfera e suas partes

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1) C

2) $V_{maior} = 1000000 \cdot V_{menor}$

$\frac{4}{3} \cdot \pi \cdot R^3 = 1000000 \cdot \frac{4}{3} \cdot \pi \cdot 1^3$

$R^3 = 1000000 \cdot \cancel{\frac{4}{3}\pi} \cdot \cancel{\frac{3}{4\pi}}$

$\hookrightarrow R = \sqrt[3]{10^6}$

$R = \cancel{\sqrt[3]{(10^2)^3}}$

$R = \boxed{100}$

3) $\frac{V_{esfera}}{V_{cilindro}} = ?$ $h = 2 \cdot 2R = 4R$

* cilindro equilátero

$\hookrightarrow H = 2R$

$\hookrightarrow \frac{4}{3} \cdot \pi \cdot R^3 \div \pi \cdot (2R)^2 \cdot 4R$

$\left(\frac{4}{3} \cdot \pi \cdot R^3\right) \cdot \left(\frac{1}{\pi \cdot 2^2 \cdot R^2 \cdot 4R}\right)$

$\rightarrow \frac{\cancel{4} \cdot \cancel{\pi} \cdot \cancel{R^3}}{3} \cdot \frac{1}{\cancel{\pi} \cdot \cancel{4} \cdot 4 \cdot \cancel{R^3}}$

$= \boxed{\frac{1}{12}}$ (E)

4) R = raio cilindro = ?

$V_{cilindro} = V_{bola 1} + V_{bola 2}$

$\pi \cdot R^2 \cdot 3 = \frac{4}{3} \cdot \pi \cdot 1^3 + \frac{4}{3} \cdot \pi \cdot 2^3$

$\pi \cdot R^2 \cdot 3 = 1\left(\frac{4}{3}\pi\right) + 8\left(\frac{4}{3}\pi\right)$

$\rightarrow \pi \cdot R^2 \cdot 3 = 9\left(\frac{4}{3}\pi\right)$

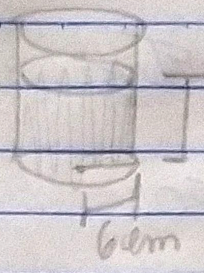
$R^2 = \cancel{9}^{3} \cdot \frac{4\cancel{\pi}}{\cancel{3}} \cdot \frac{1}{3\cancel{\pi}}$

$R^2 = \frac{\cancel{3} \cdot 4}{\cancel{3}} = 4$

$R = \sqrt{4} = \boxed{2\ km}$ (B)

situação 1: situação 2:

(5)




$\longrightarrow$


R = raio esfera = ?

V cil situação 2 = V cil situação 1 + V esfera

$\pi \cdot 6^2 \cdot (h+1) = \pi \cdot 6^2 \cdot h + \frac{4}{3} \cdot \pi \cdot R^3$

$\pi \cdot 36 (h+1) - \pi \cdot 36 \cdot h = \frac{4}{3} \cdot \pi \cdot R^3$

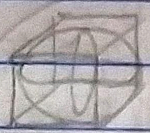
$36\pi (\cancel{h}+1-\cancel{h}) = \frac{4}{3} \pi R^3$

$\rightarrow R^3 = \frac{\overset{9}{\cancel{36}} \cancel{\pi} \cdot 3}{\cancel{4}\cancel{\pi}}$

$R^3 = 27$

$R = \sqrt[\cancel{3}]{3^{\cancel{3}}} = \boxed{3\ cm}$ (C)

(6)



diâmetro esfera = aresta cubo

$V_{esfera} = 288\pi$

$\frac{4}{3} \pi \cdot R^3 = 288\pi$

$\rightarrow R^3 = \frac{\overset{72}{\cancel{288}} \cancel{\pi} \cdot 3}{\cancel{4}\cancel{\pi}}$

$R^3 = 216$

$\rightarrow R = \sqrt[3]{2^3 \cdot 3^3}$

$R = \sqrt[\cancel{3}]{2^{\cancel{3}}} \cdot \sqrt[\cancel{3}]{3^{\cancel{3}}}$

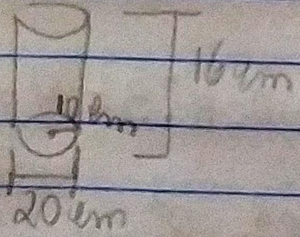
$R = 2 \cdot 3$

$R = 6\ cm$ //

| | |
|---|---|
| 216 | 2 |
| 108 | 2 |
| 54 | 2 |
| 27 | 3 |
| 9 | 3 |
| 3 | 3 |
| 1 | |

$\rightarrow 2 \cdot R = a \rightarrow a = 2 \cdot 6 = \boxed{12\ cm}$ (E)

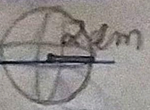
(7)




$V_{cil} = \pi \cdot 10^2 \cdot 16$

$V_{cil} = 1600\pi\ cm^3$

1 dado:




$V\ 1\ dado = \frac{4}{3} \pi \cdot 2^3$

$V\ 1\ dado = \frac{32\pi}{3}$

| dado | volume ($cm^3$) |
|---|---|
| 1 | $\frac{32\pi}{3}$ |
| $x$ | $1600\pi$ |

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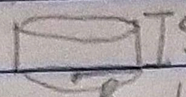
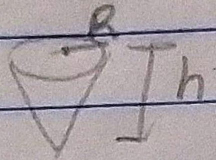
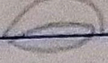
$\frac{32}{3}\pi \cdot x = 1600\pi \rightarrow x = \frac{\overset{:4}{400} \cdot 3}{8^{:4}} = \frac{\overset{50}{\cancel{100}} \cdot 3}{\cancel{2}}$

$x = \frac{\overset{:4}{1600}\cancel{\pi} \cdot 3}{32\cancel{\pi}^{:4}}$

$x = 50 \cdot 3 = \boxed{150 \text{ doces}}$ (D)

(8) V  = V  $= V$ 

*V  = $\frac{V}{2}$ 

$*\frac{1}{2}\left(\frac{4}{3} \cdot \pi \cdot R^3\right) = \pi \cdot R^2 \cdot H$

$H = \frac{1}{\cancel{2}} \cdot \left(\frac{\overset{2}{\cancel{4}}}{3} \cdot \cancel{\pi} \cdot \cancel{R^3}\right) \cdot \frac{1}{\cancel{\pi} \cdot \cancel{R^2}} \rightarrow H = \frac{2}{3}R$

$3 \cdot H = \cancel{3} \cdot \frac{2}{\cancel{3}} R \rightarrow \boxed{3H = 2R}$ (D)

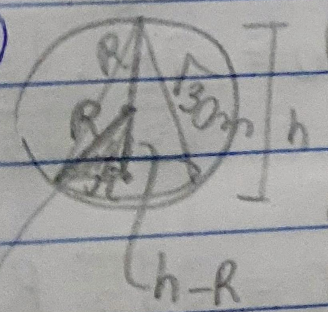
$* \pi \cdot R^2 \cdot H = \frac{1}{3} \cdot \pi \cdot R^2 \cdot h$

$H = \frac{1}{3} \cdot \cancel{\pi} \cdot \cancel{R^2} \cdot h \cdot \frac{1}{\cancel{\pi} \cdot \cancel{R^2}} \rightarrow H = \frac{h}{3}$

$3 \cdot H = \cancel{3} \cdot \frac{h}{\cancel{3}} \rightarrow \boxed{3H = h}$ (D)

Tarefa Básica - Inscrição e circunscrição de sólidos

(1)

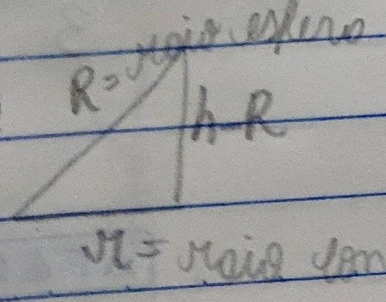


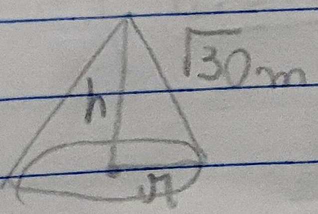

$A_{⊕} = 4\pi . R^2$

$100\pi = 4\pi . R^2$

$R^2 = \frac{\cancel{100\pi}}{\cancel{4\pi}}$

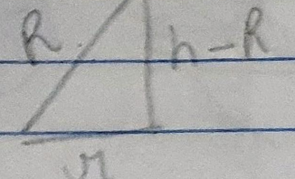
$R = \sqrt{25} = 5m$




$(\sqrt{30})^2 = h^2 + r^2$

$h^2 + r^2 = 30$




$R^2 = (h-R)^2 + r^2$

$5^2 = h^2 - 2h.5 + 5^2 + r^2$

$25 = h^2 + r^2 - 10.h + 25$

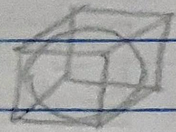
$10h = 30 + 25 - 25$

$\rightarrow 10h = 30$

$h = \frac{30}{10}$

$h = \boxed{3\,m}$

(2)



diâmetro esfera = aresta cubo

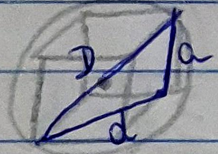
$2R = a$

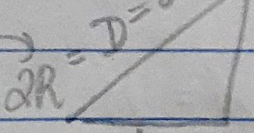
(8)

$$\frac{A_{esfera}}{A_{cubo}} = \frac{4\pi.R^2}{6.a^2}$$

$$= \frac{4\pi.R^2}{6.(2R)^2} = \frac{\cancel{4}\pi.\cancel{R^2}}{6.\cancel{4R^2}} = \boxed{\frac{\pi}{6}}$$ (A)

(3)




a = aresta cubo

d = diagonal face cubo ($d = a\sqrt{2}$)

$$\frac{V_{esfera}}{V_{cubo}} = ?$$

$(2R)^2 = a^2 + (a\sqrt{2})^2$

$4R^2 = a^2 + 2a^2$

$4R^2 = 3a^2$

$\rightarrow a^2 = \frac{4R^2}{3}$

$a = \frac{\sqrt{4R^2}}{\sqrt{3}}$

$a = \frac{2R}{\sqrt{3}} . \frac{\sqrt{3}}{\sqrt{3}}$

$a = \frac{2\sqrt{3}.R}{3}$

$\frac{4}{3}\pi.R^3 \div a^3$

$\frac{4}{3}\pi.R^3 \div \left(\frac{2\sqrt{3}.R}{3}\right)^3$

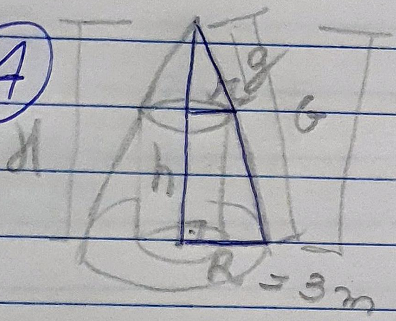
$\frac{4}{3}\pi.R^3 \div \left(\frac{2^3.(\sqrt{3})^2.\sqrt{3}.R^3}{3^3}\right)$

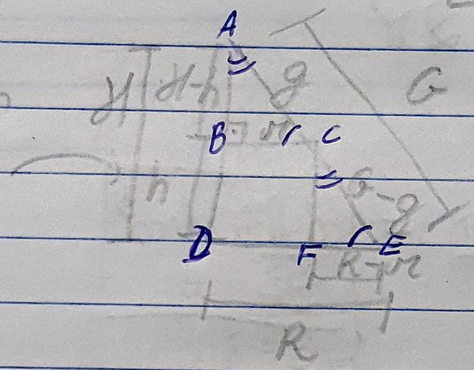
$\frac{4\pi.\cancel{R^3}}{\cancel{3}} . \frac{\overset{9}{\cancel{27}}}{8.3.\sqrt{3}.\cancel{R^3}}$ ...

$$\frac{4\pi \cdot R^{3}}{8 \cdot 3\sqrt{3}} \to \frac{\pi \cdot 3}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \to \frac{\pi \cdot 3\sqrt{3}}{2 \cdot 3}$$

$$\frac{\pi \cdot 3\sqrt{3}}{2 \cdot (\sqrt{3})^2} = \boxed{\frac{\sqrt{3}\pi}{2}} \quad (B)$$

4




* cilindro equilátero

↳ $2 \cdot r = h$

$\Delta ADE \sim \Delta ABC$

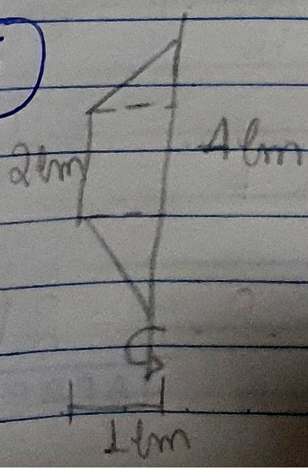
$$\frac{G}{g} = \frac{R}{r} = \frac{H}{H-h} \to \frac{3}{r} = \frac{12}{12-h} \to \frac{3}{r} = \frac{12}{12-2r} \to$$

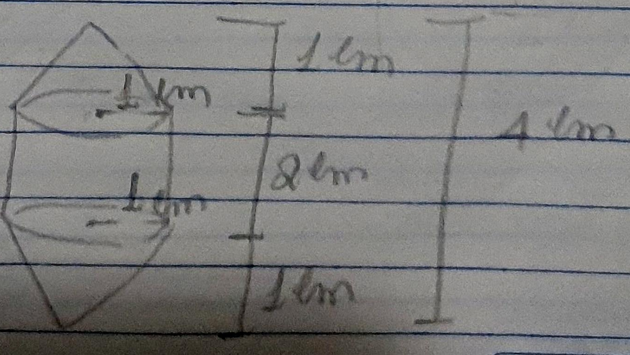
$$\to 3 \cdot (12-2r) = 12r \to 12r + 6r = 36 \to r = \frac{36}{18} = 2m$$
$$36 - 6r = 12r \qquad 18r = 36$$

$\ast\ 2r = h \to 2 \cdot 2 = h \to h = 4m$

$V = \pi \cdot 2^2 \cdot 4 = \boxed{16\pi\ m^3}$

5

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$V_{sólido} = 2 \cdot V + V$

$V_s = 2 \cdot \frac{1}{3} \cdot \pi \cdot 1^2 \cdot 1 + \pi \cdot 1^2 \cdot 2$

$V_s = \frac{2\pi}{3} + 2\pi$

$V_s = \frac{2\pi + 6\pi}{3} = \boxed{\frac{8\pi}{3} \ dm^3}$