Beatriz Bastos Borges CTII350

Tarefa Básica - Cones

1. $A_{sc} = \frac{\pi (20)^2}{2}$ $\quad A_L = \pi \cdot r \cdot 20$

$\frac{\pi (20)^2}{2} = \pi \cdot r \cdot 20 \rightarrow r = 10\,cm$

Alternativa A

$20^2 = 10^2 + h^2 \rightarrow h^2 = 400 - 100 \rightarrow h = \sqrt{300} \rightarrow h = 10\sqrt{3}\,cm$

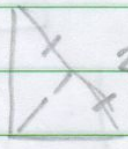
2. $64\pi = \frac{1}{3} \cdot \pi \cdot r^2 \cdot 12 \rightarrow r^2 = \frac{64}{4} \rightarrow r = \sqrt{16} \rightarrow r = 4\,cm$

$g^2 = 12^2 + 4^2 \rightarrow g^2 = 144 + 16 \rightarrow g = \sqrt{160} \rightarrow g = 4\sqrt{10}\,cm$

Alternativa B

3. $36\pi = \pi \cdot r^2 \rightarrow r = 6\,cm$

$V = \frac{1}{3} \cdot \pi \cdot 6^2 \cdot 6 \rightarrow V = 72\pi\,cm^3$ Alternativa A

4. $\sqrt{2}$  2 $\quad 2^2 = \ell^2 + \ell^2 \rightarrow 2\ell^2 = 4 \rightarrow \ell = \sqrt{2}\,cm$

$\sqrt{2}$ $\quad (\sqrt{2})^2 = 1^2 + x^2 \rightarrow x^2 = 2 - 1 \rightarrow x = 1\,cm$

$V = 2 \cdot \frac{1}{3} \cdot \pi \cdot 1^2 \cdot 1 \rightarrow V = \frac{2\pi}{3}\,cm^3$ Alternativa E

5. $V_{cilindro} = \pi \cdot 3^2 \cdot 5 = 45\pi$

$V_{cone} = \frac{1}{3} \cdot \pi \cdot 1^2 \cdot 3 = \pi$

$V_F = 45\pi - \pi \rightarrow V_F = 44\pi$ Alternativa E

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6. $V_{cone} = \frac{A_b \cdot h}{3} \rightarrow h = \frac{V_{cone} \cdot 3}{A_b}$

$V_{prisma} = A_b \cdot \frac{2h}{3} \rightarrow V_{prisma} = A_b \cdot 2 \cdot \frac{\frac{V_{cone} \cdot 3}{A_b}}{3}$

$V_{prisma} = \cancel{A_b} \cdot 2 \cdot \frac{V_{cone}}{\cancel{A_b}} \cdot \cancel{3} \cdot \frac{1}{\cancel{3}}$

$\boxed{V_{prisma} = 2\, V_{cone}}$ $\boxed{\text{Alternativa A}}$

7. $V_{abc} = \frac{1}{3} \cdot \pi \cdot x^2 \cdot y$ $\left\{ V_{abcd} = \pi \cdot x^2 \cdot y \right.$

$V_{adc} = \pi \cdot x^2 \cdot y - \frac{\pi \cdot x^2 \cdot y}{3} \rightarrow V_{adc} = \frac{3\pi \cdot x^2 \cdot y - \pi \cdot x^2 \cdot y}{3}$

$V_{adc} = \frac{2\pi \cdot x^2 \cdot y}{3}$

$R = \frac{\frac{\pi \cdot x^2 \cdot y}{3}}{\frac{2\pi \cdot x^2 \cdot y}{3}} \rightarrow R = \frac{\pi \cdot x^2 \cdot y}{3} \cdot \frac{3}{2\pi \cdot x^2 \cdot y} \rightarrow \boxed{R = \frac{1}{2}}$

$\boxed{\text{Alternativa E}}$

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Tarefa Básica - Troncos

1. $V_{tc} = \frac{\pi \cdot 3^2 \cdot 8}{3} \rightarrow V_{tc} = 24\pi \text{ cm}^3$

$V_{cp} = \frac{24\pi}{2} = 12\pi \text{ cm}^3$

$\frac{12\pi}{24\pi} = \frac{h^3}{8^3} \rightarrow 24\pi \cdot h^3 = 512 \cdot 12\pi \rightarrow h^3 = \frac{6144\pi}{24\pi}$

$h = \sqrt[3]{256} \rightarrow \boxed{h = 4\sqrt[3]{4} \text{ cm}}$ $\boxed{\text{Alternativa E}}$

2. $\frac{V_{cp}}{V_{cg}} = \frac{16^3}{20^3} \rightarrow V_{cp} = \frac{4^3}{5^3} \cdot V \rightarrow V_{cp} = \frac{64V}{125} \text{ cm}^3$

$V_{tc} = V - \frac{64V}{125} \rightarrow V_{tc} = \frac{125V - 64V}{125} \rightarrow V_{tc} = \frac{61V}{125} \text{ cm}^3$

$V \rightarrow 100\%$ $\quad x = \frac{6100}{125} \rightarrow x = 48{,}8\%$

$\frac{61V}{125} \rightarrow x$

$\boxed{\text{Alternativa C}}$

3. $\frac{R}{h} = \frac{r}{x} \rightarrow r = \frac{R \cdot x}{h}$

$V_{cg} = \frac{\pi \cdot R^2 \cdot h}{3}$

$V_{cp} = \frac{\pi \cdot r^2 \cdot x}{3} = \frac{\pi \cdot \left(\frac{R \cdot x}{h}\right)^2 \cdot x}{3} = \frac{\pi \cdot R^2 \cdot x^3}{3h^2}$

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$$V_{tc} = \frac{\pi \cdot R^2 \cdot h}{3} - \frac{\pi \cdot R^2 \cdot x^3}{3h^2} \Rightarrow V_{tc} = \frac{\pi \cdot R^2 \cdot h^3 - \pi \cdot R^2 \cdot x^3}{3h^2}$$

$$V_{tc} = \frac{\pi \cdot R^2 (h^3 - x^3)}{3h^2} \Rightarrow \frac{\pi \cdot R^2 \cdot x^3}{3h^2} = \frac{\pi \cdot R^2 (h^3 - x^3)}{3h^2}$$

$$\pi \cdot R^2 \cdot x^3 = \pi \cdot R^2 (h^3 - x^3) \Rightarrow x^3 = h^3 - x^3$$

$$2x^3 = h^3 \Rightarrow x = \frac{\sqrt[3]{h^3}}{\sqrt[3]{2}} \Rightarrow x = \frac{h}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2^2}}{\sqrt[3]{2^2}}$$

$$\boxed{x = \frac{h\sqrt[3]{4}}{2}}$$

4. $5^2 = h^2 + 3^2 \Rightarrow h^2 = 25 - 9 \Rightarrow h = \sqrt{16} \Rightarrow \boxed{h = 4\,cm}$

5. $A_b = \pi \cdot 2^2 \Rightarrow A_b = 4\pi\,m^2$

$$A_B = \pi \cdot 5^2 \Rightarrow A_B = 25\pi\,m^2$$

$$g^2 = 4^2 + 3^2 \Rightarrow g^2 = 16 + 9 \Rightarrow g = \sqrt{25} \Rightarrow g = 5\,m$$

$$A_l = \pi (5+2) 5 \Rightarrow A_l = 35\pi\,m^2$$

$$A_t = 4\pi + 25\pi + 35\pi \Rightarrow \boxed{A_t = 64\pi\,m^2}$$

$$V = \frac{\pi \cdot 4}{3} (5^2 + 2^2 + 5 \cdot 2) \Rightarrow V = \frac{\pi \cdot 4}{3} \cdot 39 \Rightarrow \boxed{V = 52\pi\,m^3}$$

6. $5^2 = h^2 + 4^2 \rightarrow h^2 = 25 - 16 \rightarrow h = \sqrt{9} \rightarrow h = 3\,cm$

$V = \frac{\pi \cdot 3}{3}(7^2 + 3^2 + 7 \cdot 3) \rightarrow V = \pi(49 + 9 + 21)$

$\boxed{V = 79\pi\,cm^3}$ $\boxed{\text{Alternativa D}}$

7. $\frac{R}{H} = \frac{x}{h} \rightarrow x = \frac{Rh}{H}$

$V_{cg} = \frac{\pi \cdot R^2 \cdot H}{3}$

$V_{cp} = \frac{\pi \cdot x^2 \cdot h}{3} \rightarrow V_{cp} = \frac{\pi \cdot \left(\frac{Rh}{H}\right)^2 \cdot h}{3} \rightarrow V_{cp} = \frac{\pi \cdot R^2 \cdot h^3}{3H^2}$

$V_{tc} = \frac{\pi \cdot R^2 \cdot H}{3} - \frac{\pi \cdot R^2 \cdot h^3}{3H^2} \rightarrow V_{tc} = \frac{\pi \cdot R^2 \cdot H^3 - \pi \cdot R^2 \cdot h^3}{3H^2}$

$V_{tc} = \frac{\pi \cdot R^2 (H^3 - h^3)}{3H^2} \rightarrow \frac{\pi \cdot R^2 \cdot h^3}{3H^2} = \frac{\pi \cdot R^2 (H^3 - h^3)}{3H^2}$

$\pi \cdot R^2 \cdot h^3 = \pi \cdot R^2 (H^3 - h^3) \rightarrow h^3 = H^3 - h^3$

$2h^3 = H^3 \rightarrow h^3 = \frac{H^3}{2} \rightarrow h = \frac{\sqrt[3]{H^3}}{\sqrt[3]{2}} \rightarrow h = \frac{H}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2^2}}{\sqrt[3]{2^2}}$

$\boxed{h = \frac{H\sqrt[3]{4}}{2}}$ $\boxed{\text{Alternativa A}}$

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