Módulo 12

1. a

$$\frac{V}{v}=\left(\frac{H}{h}\right)^3 \Rightarrow 2=\left(\frac{20}{h}\right)^3 \Rightarrow \frac{20}{h}=\sqrt[3]{2} \Rightarrow h=\frac{20}{\sqrt[3]{2}}=10\sqrt[3]{4}\cong 16\,cm$$

$$\Delta h=20-16=4\,cm$$

2. e

$$V_{total}=\frac{1}{3}.A_{base}.H=\frac{1}{3}.9\pi.12=36\pi\,cm^3$$

$$\frac{V}{v}=\left(\frac{H}{h}\right)^3 \Rightarrow \frac{36\pi}{v}=\left(\frac{12}{9}\right)^3 \Rightarrow v=\frac{243\pi}{16}\,cm^3$$

3. b

$$\begin{cases} g=2r \\ h=6\sqrt{3}\,cm \end{cases} \Rightarrow g^2=h^2+r^2 \Rightarrow \left(2r\right)^2=\left(16\sqrt{3}\right)^2+r^2 \Rightarrow 3r^2=108 \Rightarrow r=6\,cm$$

$$g=2r \Rightarrow g=12\,cm$$

4. c

$$V_P=A_{b_P}.H_P=\frac{1}{2}.\pi.6^2.1,25=22,5\pi\,cm^3$$

$$tg\,60^0=\frac{R_C}{H_C} \Rightarrow \sqrt{3}=\frac{R_C}{H_C} \Rightarrow R_C=\sqrt{3}.H_C$$

$$V_C=1,2.V_P \Rightarrow \frac{1}{3}.\pi.{R_C}^2.H_C=1,2.22,5\pi \Rightarrow \frac{1}{3}.\pi.\left(\sqrt{3}.H_C\right)^2.H_C=27\pi \Rightarrow \left(H_C\right)^3=27 \Rightarrow H_C=3\,m$$

5. b

$$\begin{cases} h=2\,m \\ g=2,5\,m \end{cases} \Rightarrow g^2=h^2+r^2 \Rightarrow 2,5^2=2^2+r^2 \Rightarrow r=1,5\,m$$

$$V=\frac{1}{3}.A_{base}.H=\frac{1}{3}.\pi.1,5^2.2 \Rightarrow V=4,5\,m^3$$

$$\frac{V}{v}=\left(\frac{H}{h}\right)^3 \Rightarrow \frac{4,5}{v}=2^3 \Rightarrow v=0,5625\,m^3$$

$$\Delta V=V-v=4,5-0,5625=3,9375\,m^3=3937,5\,L$$

6. e

$$\frac{V}{v}=\left(\frac{H}{h}\right)^3 \Rightarrow \frac{V}{200}=\left(\frac{H}{\frac{2}{3}.H}\right)^3 \Rightarrow \frac{V}{200}=\left(\frac{3}{2}\right)^3 \Rightarrow V=675\,ml$$

7. d

$$\begin{cases} 2\pi R_1=60\pi \Rightarrow R_1=30\,cm \\ 2\pi R_2=120\pi \Rightarrow R_2=60\,cm \end{cases}$$

$$sen\beta=\frac{30}{L}=\frac{60}{50+L} \Rightarrow 60L=1500+30L \Rightarrow L=50\,cm$$

$$sen\beta=\frac{30}{50}=0,6 \Rightarrow \cos\beta=0,8 \Rightarrow tg\beta=\frac{0,6}{0,8}=0,75$$

$$tg\beta=\frac{60}{H} \Rightarrow 0,75=\frac{60}{H} \Rightarrow H=80\,cm$$

8. d

$$V=\frac{1}{3}.A_{base}.H=\frac{1}{3}.\pi.5^2.12 \Rightarrow V=100\pi\,m^3=10^5\pi\,L$$

$$\begin{cases} 1\min \rightarrow 20\,L \\ t \rightarrow 10^5\pi\,L \end{cases} \Rightarrow t=\frac{10^5\pi.1}{20}=15707,96\min \cong 261,8\,h$$

9. d

$$h_{\Delta eq}=R \Rightarrow \frac{l_6.\sqrt{3}}{2}=R \Rightarrow l_6=\frac{2R\sqrt{3}}{3}$$

$$V_P=\left(6.A_\Delta\right).H_P=6.\frac{{l_6}^2.\sqrt{3}}{4}.\left(2.l_6\right)=3\sqrt{3}.\left(l_6\right)^3=3\sqrt{3}.\left(\frac{2R\sqrt{3}}{3}\right)^3=8R^3$$

$$V_C=\frac{1}{3}.\left(\pi.R^2\right).H=\frac{1}{3}.\left(\pi.R^2\right).\left(2.l_6\right)=\frac{4\pi R^3\sqrt{3}}{9}$$

$$\frac{V_P}{V_C}=\frac{8R^3}{\left(\frac{4\pi R^3\sqrt{3}}{9}\right)} \Rightarrow \frac{V_P}{V_C}=\frac{6\sqrt{3}}{\pi}$$

10.

$$V_{total}=V_{hemisf}+V_{cone}=\frac{1}{2}.\left(\frac{4}{3}\pi R^3\right)+\frac{1}{3}.\left(\pi R^2\right).h$$

$$288\pi=\frac{1}{2}.\left(\frac{4}{3}.\pi.6^3\right)+\frac{1}{3}.\left(\pi.6^2\right).h \Rightarrow 288\pi=144\pi+12\pi.h \Rightarrow h=12\,cm$$