



**Tarefa 08 – Professor Bernadelli  
Gabarito**

**01.**

$$\Delta V_{\text{ap}} = V_0 \times \gamma_{\text{ap}} \times \Delta\theta$$

$$3,2 = 400 \times \gamma_{\text{ap}} \times 40$$

$$\gamma_{\text{ap}} = \frac{3,2}{400 \times 40} = 200 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$$

$$\gamma_{\text{liq}} = \gamma_{\text{ap}} + \gamma_{\text{rec}} \rightarrow \gamma_{\text{liq}} = 200 \times 10^{-6} + 36 \times 10^{-6} = 236 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$$

**02.**

Dados:

$$V_0 = 8,0 \times 10^2 \text{ cm}^3$$

$$\alpha_{\text{Fe}} = 1,2 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$$

$$\alpha_{\text{Cu}} = 1,7 \times 10^{-5} \text{ } ^\circ\text{C}^{-1}$$

a) Aumento do volume do cilindro de ferro:

$$\Delta V_{\text{Fe}} = \gamma_{\text{Fe}} \cdot V_0 \cdot \Delta\theta$$

$$\Delta V_{\text{Fe}} = 3\alpha_{\text{Fe}} \cdot V_0 \cdot \Delta\theta$$

$$\Delta V_{\text{Fe}} = 3 \cdot 1,2 \cdot 10^{-5} \cdot 8,0 \cdot 10^2 \cdot 100 \text{ (cm}^3\text{)}$$

$$\Delta V_{\text{Fe}} = 28,8 \cdot 10^{-1} \text{ cm}^3$$

$$\Delta V_{\text{Fe}} = 28,8 \cdot 10^{-1} \text{ cm}^3$$

$$\Delta V_{\text{Fe}} = 2,88 \text{ cm}^3$$

b) Comparação entre os diâmetros a uma dada temperatura:

$$d_{\text{Cu}} = d + d \cdot \alpha_{\text{Cu}} \cdot \Delta\theta$$

$$d_{\text{Fe}} = d + d \cdot \alpha_{\text{Fe}} \cdot \Delta\theta$$

Sendo  $\alpha_{\text{Cu}} > \alpha_{\text{Fe}}$  concluímos que:  $d_{\text{Cu}} > d_{\text{Fe}}$

$$d_{\text{Cu}} - d_{\text{Fe}} = d \cdot \Delta\theta (\alpha_{\text{Cu}} - \alpha_{\text{Fe}})$$

$$2,0 \cdot 10^{-3} = 10 \cdot \Delta\theta (1,7 \cdot 10^{-5} - 1,2 \cdot 10^{-5})$$

$$\Delta\theta = \frac{2,0 \cdot 10^{-3}}{10 \cdot 0,5 \cdot 10^{-5}} \text{ (} ^\circ\text{C)}$$

$$\Delta\theta = 40 \text{ } ^\circ\text{C}$$

**03.**

a) O material é o vidro pirex.

$$\ell_0 = 200 \text{ mm}$$

$$\Delta\ell = 0,1 \text{ mm}$$

$$\Delta T = 100 \text{ } ^\circ\text{C}$$

$$\Delta\ell = \alpha \cdot \ell_0 \cdot \Delta T$$

$$\alpha = \frac{\Delta\ell}{\ell_0 \cdot \Delta T} = \frac{0,1 \text{ mm}}{200 \text{ mm} \cdot 100 \text{ } ^\circ\text{C}} = 5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$$

b)  $\ell = 200,21 \text{ mm}$

**04. C**

**05. B**

**06. C**

**07. A**