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Conteúdo

^{ra}
I − Teste

Questão 2

$$1\,\mathrm{W} = 1\mathrm{kgm^2s^{-3}}$$

Questão 3

$$3\,\mathrm{Pa} = 3\,\mathrm{kgm^{-1}s^{-2}} = 3*10^{3-2}\,\mathrm{g\,cm^{-1}s^{-2}} = 3*10\,\mathrm{g\,cm^{-1}s^{-2}}$$

Questão 4

$$8\,\mathrm{J} = 8\,\mathrm{N\,m} = 8\,\mathrm{kg\,m^2\,s^{-2}} = 8\,\mathrm{kg\,m^2\,s^{-2}}\,\frac{\mathrm{lb}}{0.4536\,\mathrm{kg}}\left(\frac{\mathrm{ft}}{0.3048\,\mathrm{m}}\right)^2 =$$

$$= 8\,\mathrm{lb\,ft^2\,s^{-2}}\,\frac{1}{0.4536}\frac{1}{0.3048^2} \cong 189.84\,\mathrm{lb\,ft^2\,s^{-2}}$$

Questão 5

$$= \mathrm{M\,L^{-1}\,T^{-2}} = [A]$$

Questão 6

$$[V]^a = (\mathrm{L}^3)^a = [k]\,[m]^b\,[\Delta T]^{-6}\,[P]^n = (\mathrm{M})^b\,(\mathrm{T})^{-6}\,(\mathrm{M\,L}^{-1}\,\mathrm{T}^{-2})^n =$$

$$= \mathrm{M}^{b+n}\,\mathrm{T}^{-6-2\,n}\,\mathrm{L}^{-n} \implies \left\{ \begin{array}{r} b+n = 0 \implies b = 3 \\ -6 - 2\,n = 0 \implies n = -3 \\ -n = 3\,a \implies a = 1 \end{array} \right\}$$

Questão 7

$$[\boldsymbol{\Delta P}] = \mathrm{M\,L}^{-1}\,\mathrm{T}^{-2}$$

$$[\boldsymbol{D}] = \mathrm{L} \qquad [\boldsymbol{\omega}] = \mathrm{M\,L}^2\,\mathrm{T}^{-2}$$

$$[\boldsymbol{\rho}] = \mathrm{M\,L}^{-3} \qquad [\boldsymbol{G_v}] = \mathrm{L}^3\,\mathrm{T}^{-1}$$

Questão 8

$$[\boldsymbol{V}] = \mathrm{L\,T}^{-1}$$

$$[\boldsymbol{d}] = \mathrm{L} \qquad [\boldsymbol{\mu}] = \mathrm{M\,L}^{-1}\,\mathrm{T}^{-2} \qquad [\boldsymbol{\gamma}] = [\boldsymbol{\gamma_s}] = \mathrm{M\,L}^{-3}$$

Questão 9

$$h = \frac{f \, L \, V^2}{2 \, D \, g}$$

$$[h] = \mathrm{L} = \frac{[f] \, [L] \, [V]^2}{[2] \, [D] \, [g]} = \frac{[f] \, \mathrm{L} \, (\mathrm{L} \, \mathrm{T}^{-1})^2}{(\mathrm{L}) \, (\mathrm{L} \, \mathrm{T}^{-2})} = [f] \, \mathrm{L}^1 \implies [f] = 1$$

Questão 10

$$G_s = v \, S = 23 \, \pi \, (11 \, \mathrm{E}\!-\!1)^2 = 23 \, \pi \, (11)^2 \, \mathrm{E}\!-\!2 \cong 87.43$$

Questão 11

$$\bar{v} = \frac{D^2}{32 \, \mu} \frac{-\Delta P}{L}$$

$$\bar{v} = \frac{D^2}{32 \, \mu} \frac{-\Delta P}{L} = \frac{(2 * 2.5 \, \mathrm{E}\!-\!5)^2}{32 * 0.003} \frac{1.3 \, \mathrm{E} \, 3}{1.1 \, \mathrm{E}\!-\!3} = \frac{(2 * 2.5)^2}{32 * 0.003} \frac{1.3}{1.1} \, \mathrm{E}\!-\!4 \cong 30.78 \,\mathrm{I}$$

Questão 12

$$\bar{v} = \frac{D^2}{32\,\mu}\,\frac{-\Delta P}{L}$$

$$\mu = \frac{D^2}{32\,\bar{v}}\,\frac{-\Delta P}{L} = \frac{(8\,\mathrm{E}{-2})^2}{32\,(G_s/S)}\,\frac{8\,\mathrm{E}\,6}{50} = \frac{(8\,\mathrm{E}{-2})^2}{32\,((0.2/60)/(\pi * (8\,\mathrm{E}{-2}/2)^2))}\,\frac{8\,\mathrm{E}\,6}{50}$$

$$= \frac{8^3}{32 * 50\,\frac{(0.2/60)}{(\pi*(8/2)^2)}}\,\mathrm{E}{-2} =$$

$$\cong 48.25$$

Questão 17

$$\int \tau\,\mathrm{d}x = \int \mu\,\mathrm{d}v \implies \mu = \tau\frac{\Delta x}{\Delta v} = 349\frac{7\,\mathrm{E}{-2}}{1}\,\mathrm{Pa} \cong 244.30\,\mathrm{poise}$$

Questão 18

$$v_x(y) = \left(-\frac{\mathrm{d}P}{\mathrm{d}x}\right)\,\frac{H^2}{8\,\mu}\,\left(1 - \left(\frac{2\,y}{H}\right)^2\right)$$

$$\tau = \frac{\mu}{\Delta y}\,\Delta v = \frac{\mu}{H} - \left(\left(-\frac{\mathrm{d}P}{\mathrm{d}x}\right)\,\frac{H^2}{8\,\mu}\,\left(1 - \left(\frac{2\,H}{H}\right)^2\right)\right) =$$

$$= -\left(11520\,\frac{3\,\mathrm{E}{-1}}{8}\,(1 - 4)\right)$$