Volumen

1) $1\,\ell = 1\,dm^3 = 1\,dm^3 \cdot \frac{(10\,cm)^3}{1\,dm^3} = 10^3\,cm^3 = 1000\,cm^3$

2) $1\,m^3 = 1\,m^3 \cdot \frac{(10\,dm)^3}{1\,m^3} = 10^3\,dm^3 = 10^3\,\ell = 1000\,\ell.$

Masa

1) $10^{-9}\,g = 1\,ng$ y $1\,fg = 10^{-15}\,g.$

2) $1\,kg = 1\,kg \cdot \frac{10^6\,mg}{1\,kg} \cdot \frac{1\,gr.mét.}{50\,mg} \cdot \frac{1\,quilate}{4\,gr.mét.} = \frac{10^6}{50 \cdot 4}$ quilates = 5000 quilates.

Densidad.

1) Agua $\rho = 1\,kg/\ell$

$\rho = 1\,kg/\ell = 1000\,g/\ell = 1\,g/m\ell =$

$\rho = 1000\,g/\ell = 1000\,g/dm^3 = \frac{1000\,g}{10^3\,cm^3} = 1\,g/cm^3$

$\rho = 1\,kg/\ell = \frac{1\,kg}{(0{,}1\,m)^3} = 10^{-3}\,kg/m^3 = 0{,}001\,kg/m^3$

2) $\rho = 13579{,}04\,kg/m^3$ $\qquad$ $\rho = 13600\,kg/m^3$

$V = 76\,cm \cdot 1\,cm^2 = 76\,cm^3$

$m = \rho \cdot V = 13579{,}04\,kg/m^3 \cdot 76\,cm^3 = 13579{,}04\,\frac{kg}{(100\,cm)^3} \cdot 76\,cm^3 =$

$= \frac{13579{,}04\,kg}{10^6} \cdot 76 = 1{,}032\,kg$

$m = 1{,}032\,kg.$

$m = 1{,}0336\,kg$ con $\rho = 13600\,kg/m^3$

Mol.

1) Mol de agua. Tengo $N_A = 6.022 \cdot 10^{23}$ moléculas de agua.
Como el agua es H_2O tengo el doble de Hidrógenos y
la misma cdad de oxígenos ($6.022 \cdot 10^{23}$) $\rightarrow 1.2044 \cdot 10^{24}$

Frecuencia

1) $f = 90 \text{ veces/min} = 90 \text{ veces}/60\text{s} = 3/2\ s^{-1} = \underline{1.5\ Hz}$.

Angulos.

2) $1\text{rad} = 1\text{rad} \cdot \dfrac{360°}{2\pi\text{ rad}} = \underline{57{,}29°}$.

2) $12° 13' 45'' = \left(12 + \dfrac{13}{60} + \dfrac{45}{3600}\right)° = 12{,}229°$

$12{,}229° \cdot \dfrac{2\pi}{360°} = 0{,}21\text{ rad}$.

3) $31' 31'' = \left(\dfrac{31}{60} + \dfrac{31}{3600}\right)° = \underline{0{,}525°} = 0{,}525° \cdot \dfrac{\pi}{180°} = 0{,}009916\text{ rad}$.

$32' 33'' = \left(\dfrac{32}{60} + \dfrac{33}{3600}\right)° = \underline{0{,}5425°} = 0{,}5425 \cdot \dfrac{\pi}{180} = 0{,}00947\text{rad}$

Fuerza

1) $1N = 1kg \cdot 1m/s^2 = 1000g \cdot 100cm/s^2 = \underline{10^5\ dyn}$.

2) $32kp = 32kp \cdot \dfrac{9.8N}{1kp} = \underline{313{,}6N}$.

Presión.

1) $1\,Pa = 1\,N/m^2$ y sabemos que $1\,N = 10^5\,dyn$.

$1\,baria = 1\,dyn/cm^2$ y ~~1 baria~~ $1\,bar = 10^6\,baria$.

$$1\,Pa = 1\,N/m^2 \cdot \frac{10^5\,dyn}{1\,N} \cdot \frac{1\,m^2}{10^4\,cm^2} = 10\,barias.$$

$$\boxed{1\,Pa = 10\,barias = 10 \cdot 10^{-6}\,bar = 10^{-5}\,bar} \qquad \boxed{1\,bar = 10^5\,Pa.}$$

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2)

$$1\,atm = 760\,mmHg = \frac{\text{Peso columna de mercurio de 76 cm.}}{\text{Sección } 1\,cm^2.}$$

$m_{76\,cmHg} = 1{,}032\,kg$

con 13600 kg → $\dfrac{1{,}0336\,kg \cdot 9{,}8\,m/s^2}{(0{,}01\,m)^2} = 101\,292{,}8\,Pa$

$$\boxed{1\,atm = \frac{m_{76\,cmHg} \cdot g}{1\,cm^2} = \frac{1{,}032\,kg \cdot 9{,}8\,m/s^2}{(0{,}01\,m)^2} = 101\,136\,Pa.}$$

101 325 Pa ↓ mejor aprox.

$$\boxed{1\,Pa = 9{,}89 \cdot 10^{-6}\,atm.}$$

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3) $1\,bar = 10^5\,Pa$ $\qquad 1\,mbar = 100\,Pa.$

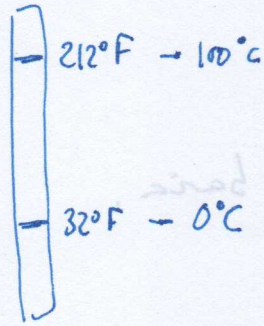
$$\boxed{1\,atm = 101\,136\,Pa = 101\,136\,Pa \cdot \frac{1\,mbar}{100\,Pa} = 1011{,}3\,mbar}$$

1013 mbar. ↓ mejor aprox.

$$1\,atm = 101\,292{,}8\,Pa \cdot \frac{1\,mbar}{100\,Pa} = 1012{,}9\,mbar$$

$\simeq 1013\,mbar.$

Temperatura.

1) 

$$°F = \alpha\ °C + \beta$$

$$\begin{cases} 212°F = \alpha \cdot 100°C + \beta \\ 32°F = \alpha \cdot 0°C + \beta = \beta \end{cases}$$

$$212°F = \alpha \cdot 100°C + 32°F$$

$$\alpha = \frac{212°F - 32°F}{100°C} = 1{,}8\ °F/°C$$

~~$°F = 1{,}8\ °F/°C \cdot °C +$~~ ~~$°F = 1{,}8 \cdot °C + 32°F$~~

$$\boxed{°F = 1{,}8\ °C + 32}$$ → Fórmula de conversión.

Energía.

$E_i = 300\,J$ $\quad E_f = E_i = \frac{1}{2} m v^2 \Rightarrow v = \sqrt{\frac{2E_i}{m}} =$

1) 

$v = 77{,}45\,m/s.$

$m = 100\,g$

a) $a = \frac{v_f^2 - v_i^2}{2s} = \frac{(77{,}45\,m/s)^2}{2 \cdot 10cm} = \frac{6000\,m^2/s^2}{2 \cdot 0{,}1\,m} = 3 \cdot 10^4\,m/s^2$

b) $F = m \cdot a = 0{,}1\,kg \cdot 3 \cdot 10^4\,m/s^2 = \underline{3000\,N.}$

c) $W = F \cdot d = 3000\,N \cdot 0{,}1cm = \underline{300\,J.}$

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2) $1\,J = 1N \cdot 1m = 10^5\,dyn \cdot 100\,cm = 10^7\,dyn \cdot cm = 10^7\,erg.$

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3) $1\,cal = 4{,}19\,J \rightarrow 1\,J = \frac{1}{4.19}\,cal = 0{,}24\,cal.$

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4) $E_p = mgh \Rightarrow W = F \cdot d = 75\,kp \cdot 1m = 75 \cdot 9{,}8N \cdot 1m = 735\,J$

$P = E/t = 735\,J/1s = 735\,W.$