

POSSIBLY USEFUL INFORMATION

Possibly Useful Information

Conversions and Constants:

$$1000 \text{ m} = 1 \text{ km} \quad 100 \text{ cm} = 1 \text{ m} \quad 1000 \text{ mm} = 1 \text{ m} \quad 1 \text{ mL} = 1 \text{ cm}^3$$

$$1 \text{ Newton (N)} = 1 \frac{\text{kg} \cdot \text{m}}{\text{s}^2} \quad 1 \text{ Joule (J)} = 1 \text{ N} \cdot \text{m} \quad 1 \text{ Watt (W)} = 1 \frac{\text{J}}{\text{s}} = 1 \text{ V} \cdot \text{A}$$

$$1 \text{ Volt (V)} = 1 \frac{\text{J}}{\text{C}} \quad 1 \text{ Ampere (A)} = 1 \frac{\text{C}}{\text{s}} \quad 1 \text{ Ohm } (\Omega) = 1 \frac{\text{V}}{\text{A}}$$

$$1 \text{ calorie} = 4.186 \text{ J} \quad 1 \text{ Pascal} = 1 \frac{\text{N}}{\text{m}^2} \quad 1 \text{ atm} = 10^5 \text{ Pa}$$

$$T(\text{K}) = T(^{\circ}\text{C}) + 273 \quad T(^{\circ}\text{F}) = \frac{9}{5} T(^{\circ}\text{C}) + 32 \quad 1 \text{ Hz} = 1 \text{ s}^{-1}$$

$$g = 10 \frac{\text{m}}{\text{s}^2} \quad v_{\text{sound in air @ room temperature}} = 340 \frac{\text{m}}{\text{s}} \quad \Delta = \text{“change in...”}$$

$$G = 6.67 \times 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2} \quad k = 9.0 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2} \quad c = 3.0 \times 10^8 \frac{\text{m}}{\text{s}} \quad q_{\text{proton}} = 1.6 \times 10^{-19} \text{ C}$$

$$h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s} \quad m_{\text{electron}} = 9.11 \times 10^{-31} \text{ kg} \quad m_{\text{proton}} = 1.67 \times 10^{-27} \text{ kg}$$

$$\text{Density of water} = 1.0 \frac{\text{g}}{\text{cm}^3} \quad \text{Density of Alcohol} = 0.82 \frac{\text{g}}{\text{cm}^3}$$

$$\text{Specific Heat Capacity of water} = 1.0 \frac{\text{cal}}{\text{g } ^{\circ}\text{C}}$$

$$\text{Ice-Water Latent Heat} = 80 \frac{\text{cal}}{\text{g}} \quad \text{Water-Steam Latent Heat} = 540 \frac{\text{cal}}{\text{g}}$$

Mechanics:

$$\text{Position / Path / Displacement} \quad \Delta x = x_{\text{final}} - x_{\text{initial}}$$

$$\text{Average Speed / Average Velocity} \quad s_{\text{ave}} = \frac{\text{Path}}{\text{Time}} \quad v_{\text{ave}} = \frac{\text{Displacement}}{\text{Time}} = \frac{\Delta x}{\Delta t}$$

$$\text{Average acceleration / Free Fall } (a = g) \quad a_{\text{ave}} = \frac{\Delta v}{\Delta t} \quad v = at \quad d = \frac{1}{2} at^2$$

$$\text{Inertia / Forces / Weight / Mass} \quad F_{\text{net}} = ma \quad \text{Weight} = mg$$

$$\text{Momentum / Impulse} \quad p = mv \quad \Delta p = \Delta(mv) = F\Delta t$$

$$\text{Conservation of Momentum / Collisions} \quad p_{\text{final}} = p_{\text{initial}} \text{ (for a system)}$$

$$\text{Kinetic Energy / Gravitational Potential Energy} \quad KE = \frac{1}{2} mv^2 \quad GPE = mgh$$

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Energy / Conservation of Energy

$$E = KE + GPE$$

$$E_{final} = E_{initial}$$

Work / Power

$$W = (F_{parallel})\Delta x = \Delta KE$$

$$P = \frac{\Delta E}{\Delta t}$$

Centripetal Force / Torque

$$F = \frac{mv^2}{r}$$

$$\tau = (F_{perpendicular}) \times d$$

Angular Momentum / Conservation of Ang. Momentum $L = mvr = I\omega$

$$L_{final} = L_{initial}$$

Gravity

$$F = \frac{Gm_1m_2}{d^2}$$

Properties of Matter:

Solids / Liquids / Gases / Plasmas

$$(\text{Mass}) \text{ Density} = \frac{m}{V}$$

$$\text{Weight Density} = \frac{mg}{V}$$

$$\text{Hooke's law: } F = k\Delta x$$

$$P = \frac{F}{A}$$

$$P = (\text{Density}) \times g \times (\text{Depth}) \quad F_{buoy} = (\text{Density}) \times (V_{submerged}) \times g$$

$$P_1V_1 = P_2V_2$$

Temperature, Heat & Thermodynamics:

$$\text{Rate of Cooling/Warming} \propto \Delta T$$

$$Q = mc\Delta T$$

$$Q_{phase\ change} = m(\text{Latent Heat})$$

$$\Delta L = L_0\alpha\Delta T$$

$$Q = \Delta E_{int} + W$$

$$e = \frac{T_H - T_C}{T_H}$$

$$\text{Coef. of Perf.} = \frac{T_C}{T_H - T_C}$$

Waves & Sound:

Frequency / Wave Speed / Resonance / Beats

$$f = \frac{1}{T}$$

$$v_{wave} = \lambda f$$

$$f_{n,string} = nf_1$$

$$f_{beat} = |f_1 - f_2|$$

$$f = \left(\frac{v \pm v_o}{v \pm v_s} \right) f$$

Electricity & Magnetism:

$$F = \frac{kq_1q_2}{d^2}$$

$$E = \frac{F}{q}$$

$$V = \frac{EPE}{q}$$

$$V = IR$$

$$P = VI$$

$$R_{series} = R_1 + R_2 + \dots$$

$$\frac{1}{R_{parallel}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$$

$$\frac{V_{prim}}{N_{prim}} = \frac{V_{sec}}{N_{sec}}$$

$$V_{prim}I_{prim} = V_{sec}I_{sec}$$

$$I_{prim}N_{prim} = I_{sec}N_{sec}$$

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Light:

$$R + B = M \quad R + G = Y \quad B + G = C \quad M + G = Y + B = C + R = W$$

$$\theta_{\text{inc}} = \theta_{\text{refl}} \quad n = \frac{\text{speed of light in vacuum}}{\text{speed of light in material}} \quad \Delta E = hf \quad \bar{f} \propto T$$

Atomic & Nuclear physics:

$$\Delta x \Delta p \geq \frac{h}{2\pi} \quad \Delta E \Delta t \geq \frac{h}{2\pi} \quad \lambda = \frac{h}{p} = \frac{h}{mv}$$

$$E = mc^2 \quad {}^A_Z X \rightarrow {}^{A-4}_{Z-2} X + \alpha \quad {}^A_Z X \rightarrow {}^A_{Z+1} X + \beta^-$$

You will also be provided with a periodic table of elements.