DATA SHEET - PHYSICS 131

PHYSICAL CONSTANTS

$c = 3.00\times10^{8}\ \text{m s}^{-1}$	$G = 6.67\times10^{-11}\ \text{N m}^{2}\ \text{kg}^{-2}$	$g = 9.80\ \text{m s}^{-2}$
$\rho_{Water} = 1.00\times10^{3}\ \text{kg m}^{-3}$	$\rho_{Mercury} = 1.36\times10^{4}\ \text{kg m}^{-3}$	$n_{Air} = 1.00$
$n_{Water} = 1.33$	$n_{Flint\ glass} = 1.70$	$n_{CR39} = 1.498$
$n_{Diamond} = 2.45$	$L_f(\text{water}) = 3.35\times10^{5}\ \text{J kg}^{-1}$	$L_v(\text{water}) = 2.26\times10^{6}\ \text{J kg}^{-1}$
$0^{o}C = 273\ \text{K}$	$c_{Water} = 4180\ \text{J kg}^{-1}\ \text{K}^{-1}$	$c_{Ice} = 2090\ \text{J kg}^{-1}\ \text{K}^{-1}$
$c_{Steam} = 2005\ \text{J kg}^{-1}\ \text{K}^{-1}$	$R = 8.31\ \text{J mol}^{-1}\ \text{K}^{-1}$	$k = 1.38\times10^{-23}\ \text{J K}^{-1}$
$\sigma = 5.67\times10^{-8}\ \text{W m}^{-2}\ \text{K}^{-4}$	$\alpha_{Steel} = 1.1\times10^{-5}\ {}^{o}\text{C}^{-1}$	$\alpha_{Alum.} = 2.5\times10^{-5}\ {}^{o}\text{C}^{-1}$
$\lambda_{Copper} = 390\ \text{W m}^{-1}\ {}^{o}\text{C}^{-1}$	$\lambda_{Silver} = 420\ \text{W m}^{-1}\ {}^{o}\text{C}^{-1}$	$\lambda_{water} = 7.3\times10^{-2}\ \text{W m}^{-1}\ {}^{o}\text{C}^{-1}$

MECHANICS

$v = u + at$ $\quad s = \frac{1}{2}(u+v)t$ $\quad s = ut + \frac{1}{2}at^{2}$ $\quad v^{2} = u^{2} + 2as$ $\quad P = mv$

$g = \frac{GM}{R^{2}}$ $\quad \tau = \text{F}\times\text{r}$ $\quad F = \frac{Gm_1m_2}{r^{2}}$ $\quad KE = \frac{1}{2}mv^{2}$ $\quad PE = mgh$

$P = \rho gh$ $\quad W = \frac{1}{2}F\Delta l$ $\quad a^{2} = b^{2} + c^{2} - 2bc\cos\theta$ $\quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$P = \frac{W}{t}$ $\quad \rho = \frac{m}{V}$ $\quad W = \Delta KE$

PROPERTIES OF MATTER

$Y = \frac{\sigma}{\varepsilon}$ $\quad \varepsilon = \frac{\Delta l}{l}$ $\quad \sigma = \frac{F}{A}$ $\quad \gamma = \frac{F}{l}$ $\quad h = \frac{2\gamma\cos\theta}{r\rho g}$ $\quad \Delta P = \frac{2\gamma}{r}$ $\quad W = \frac{1}{2}F\Delta l$

$strain\ energy = \frac{1}{2}\sigma\varepsilon V$ $\quad F_{Upthrust} = \rho Vg$ $\quad RD_s = \frac{\rho_s}{\rho_w}$

WAVES

$V \propto \sqrt{T}$ $\quad BF = f_1 - f_2$ $\quad f' = \frac{V \pm v_o}{V \pm v_s} f$ $\quad V = \sqrt{\frac{T}{\mu}}$ $\quad f_n = \frac{nV}{2L}\ \text{or}\ \frac{nV}{4L}$

GEOMETRICAL OPTICS

$$n = \frac{1}{\sin C} \qquad n_1 \sin\theta_1 = n_2 \sin\theta_2 \qquad \frac{1}{u} + \frac{1}{v} = \frac{1}{f} = \frac{2}{r} \qquad \frac{1}{u} + \frac{1}{v} = \frac{1}{f} \qquad \frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2}$$

$$n = \frac{\sin\frac{1}{2}(A + D_m)}{\sin\frac{1}{2}A} \qquad m = \frac{v}{u} = \frac{i}{o} \qquad \frac{1}{f} = (n-1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right) \qquad n = \frac{c}{\mathrm{v}} \qquad n = \frac{\textit{real depth}}{\textit{apparent depth}}$$

THERMAL PHYSICS

$$Q = cm\Delta T \qquad Q = Lm \qquad \alpha = \frac{\Delta l}{l_o \Delta T} \qquad \beta = \frac{\Delta V}{V_o \Delta T} \qquad \frac{Q}{t} = \lambda A \frac{\Delta T}{\Delta \mathrm{x}}$$

$$\beta = 3\alpha \qquad \frac{Q}{t} = I\varepsilon A\cos\theta \qquad \frac{Q}{t} = \varepsilon\sigma A\left(T_1^4 - T_2^4\right) \qquad n = \frac{m}{M} \qquad PV = nRT$$

$$W = -P\Delta V = -nR\Delta T \qquad T_F = \frac{9}{5}T_C + 32$$