# Physics 102 Major1
## Formula sheet
## Spring Semester 2005-2006 (Term 052)

$v = \lambda f = \frac{\omega}{k}$

$v = \sqrt{\frac{\tau}{\mu}} \qquad v = \sqrt{\frac{B}{\rho}}$

$y = y_m \sin(kx - \omega t + \varphi)$

$P = \frac{1}{2}\mu\omega^2 \, y_m{}^2 \, v$

$S = S_m \cos(kx - \omega t)$

$\Delta P = \Delta P_m \sin(kx - \omega t)$

$\Delta P_m = \rho v \omega S_m$

$I = \frac{1}{2}\rho(\omega S_m)^2 v$

$\beta = 10\log\left(\frac{I}{I_o}\right)$

$I = \frac{\text{Power}}{\text{Area}}$

$f' = f\left(\frac{v \pm v_D}{v \mp v_s}\right)$

$y = \left(2y_m \cos\frac{\varphi}{2}\right)\sin\left(kx - \omega t + \frac{\varphi}{2}\right)$

$y = (2y_m \sin kx)\cos\omega t$

$f_n = \frac{nv}{2L}, \qquad n = 1,2,3,...$

$f_n = \frac{nv}{4L}, \qquad n = 1,3,5...$

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

$PV = nRT = NkT$

$\Delta L = \frac{\lambda}{2\pi}\varphi$

$\Delta L = m\lambda \qquad m = 0,1,2,....$

$\Delta L = \left(m + \frac{1}{2}\right)\lambda, \qquad m = 0,1,2,.....$

$PV^{\gamma} = \text{constant}$

$TV^{\gamma - 1} = \text{constant}$

$T_F = \frac{9}{5}T_C + 32$

$Q = mL \qquad Q = mc\Delta T$

$\Delta E_{int} = Q - W \qquad \Delta E_{int} = nC_V \Delta T$

$C_p - C_v = R \qquad W = \int P dV$

$H = \frac{Q}{t} = \kappa A \frac{T_H - T_C}{L}$

$P = \sigma\varepsilon A T^4 \qquad \frac{m\overline{v^2}}{2} = (3/2)kT$

$v_{rms} = \sqrt{\frac{3RT}{M}}$

$Q = nc_p \Delta T, \quad Q = nc_v \Delta T$

$W = Q_h - Q_c \qquad \varepsilon = \frac{W}{Q_h} = 1 - \frac{Q_c}{Q_h}$

$K = \frac{Q_c}{W} \qquad \frac{Q_c}{Q_h} = \frac{T_c}{T_h} \qquad \Delta S = \int \frac{dQ}{T}$

$c_v = \frac{3}{2}R \quad \textit{for monatomic gases.}$

$= \frac{5}{2}R \quad \textit{for diaatomic gases.}$

$\Delta S = nc_v \ln\frac{T_f}{T_i} + nR \ln\frac{V_f}{V_i}$

## Constants:

$\text{Pi} = \pi$

1 Liter = $10^{-3}$ $m^3$

R = 8.31 J/mol K

$N_A$ = 6.02 x $10^{23}$ molecules/mole

1 atm = 1.01 x $10^5$ $N/m^2$

k = 1.38 x $10^{-23}$ J/K

$I_o$ = $10^{-12}$ $W/m^2$

1 calorie = 4.186 Joule

$\sigma = 5.67x10^{-8} W/(m^2 K^4)$

micro = $10^{-6}$

for water: $L_f$ = 80 cal/g

$L_v$ = 540 cal/g

c = 1 cal/g.K

$c_{ice}$ = 0.53 cal/g.K