PHY 2048 and 2049 formula sheet

$v^2=v_0^2+2a(x-x_0)$ $\sum F = ma$ $v=r\omega$ $a_c = \frac{v^2}{r}$

$p=mv$ $I=F\Delta t=\Delta p$ $I = \sum mr^2$ $\tau = I\alpha = r \cdot F$

$f = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$ $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$ $\rho AV=constant$ $p+\frac{1}{2}\rho v^2+\rho gy=constant$

$y=A\sin(kx-\omega t)$ $\omega=\frac{2\pi}{T}=2\pi f$ $\beta = 10\log(\frac{I}{I_0})$ $\frac{\Delta L}{L} = \alpha\Delta T$ $\frac{\Delta V}{V} = \beta\Delta T$

Isothermal	Constant-volume	Isobaric	Adiabatic
T=constant; Q=W	V=constant; Q=ΔW	p=constant; Q=ΔU+W	Q=0; ΔU=-W
$W=nRT\ln(\frac{V_2}{V_1})$	W=0	$W=p(V_2-V_1)$	$W=\frac{p_1V_1-p_2V_2}{\gamma-1}$
pV=constant	$Q=nC_v\Delta T$	$Q=nC_p\Delta T$; $C_p=C_v+R$	$pV^\gamma = constant; TV^{\gamma-1} = constant$

$C_p=\frac{5}{2}R$ $C_v=\frac{3}{2}R$ $pV=nRT$ $dS = \frac{dQ}{T}$

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$\Delta E = Q + W$

$\vec{F} = \frac{kq_1q_2}{r}\hat{r}$

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

$\vec{E} = \frac{\vec{F}}{q_{test}} = \frac{kq}{r^2}\hat{r}$

$V(r) = \frac{kq}{r}$

$\oint \vec{E} \cdot d\vec{A} = \frac{q_{enclosed}}{\varepsilon_0}$

$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$

$C = C_1 + C_2$

$V = IR$

$P = IV$

$P = I^2R$

$R = R_1 + R_2$

$\vec{F} = q\vec{V} \times \vec{B}$

$\vec{F} = I\vec{L} \times \vec{B}$

$\oint \vec{B} \cdot d\vec{r} = \mu_0 I_{enclosed}$

$B = \mu_0 nI$

$B = \frac{\mu_0 NI}{2\pi r}$

$\varepsilon = -\frac{d\varphi_B}{dt} = BlV$

$\omega_0 = \frac{1}{\sqrt{LC}}$

$Z = \sqrt{R^2 + (X_L - X_C)^2}$

$X_C = \frac{1}{\omega C}$

$X_L = \omega L$

$n_1\sin(\theta_1) = n_2\sin(\theta_2)$

$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f}$

$C = \frac{Q}{V}$

$V = V_c e^{-\frac{t}{RC}}$

$V_c = \epsilon(1 - e^{-\frac{t}{RC}})$

$\phi = \vec{E} \cdot \vec{A}$ $\phi = \oint \vec{E} dA\cos\theta$

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