Formula Sheet for Physics 1125 Diagnostic Test

$\sin(\vartheta)=\frac{\text{opp}}{\text{hyp}}$ $\cos(\vartheta)=\frac{\text{adj}}{\text{hyp}}$ $\tan(\vartheta)=\frac{\text{opp}}{\text{adj}}$ If $AX^2+BX+C=0$ then $X=\frac{-B\pm\sqrt{B^2-4AC}}{2A}$

$\Delta x=x-x_0$ $v_{av}=\frac{\Delta x}{\Delta t}$ $a_{av}=\frac{\Delta v}{\Delta t}$ $v_{av}=\frac{1}{2}(v_1+v_0)$

$v=v_0+at$ $x=x_0+v_{av}t$ $x=x_0+v_0t+\frac{1}{2}at^2$ $v_1^2=v_0^2+2a(x_1-x_0)$

$\sum\vec{F}=m\vec{a}$ ($\sum F_x=ma_x$, $\sum F_y=ma_y$) $f_k=\mu_k F_n$ $f_s^{max}=\mu_s F_n$

$a_c=\frac{v^2}{r}$ $v=\frac{2\pi r}{T}$ $f=\frac{1}{T}$ $F=G\frac{mM}{r^2}$

$'W_{nc}'=\Delta K+\Delta U$ $'W_{nc}'=W_{ext}+'W_f'$ $W=|\vec{F}|\cos\phi\,|\vec{\Delta x}|=F_x\Delta x$

$U_g=mgy$ $K=\frac{1}{2}mv^2$ $W_c=-\Delta U$ $P_{av}=\frac{W}{\Delta t}=F_x v_{av}=|\vec{F}|\cos\phi\,|\vec{v}_{av}|$

$\vec{p}=m\vec{v}$ $\vec{F}_{av}\Delta t=\Delta\vec{p}$ $\tau=Fl=F r_{perp}=F r\sin\vartheta$

$|\vec{F}_{12}|=k\frac{|q_1q_2|}{r^2}$ $|\vec{E}|=k\frac{|Q|}{r^2}$ $\vec{F}=q\vec{E}$ $V=k\frac{Q}{r}$ $U_E=qV$ $|\Delta V|=E|\Delta y|$

$I=\frac{\Delta q}{\Delta t}$ $V=IR$ $P=IV=I^2R=\frac{V^2}{R}$ $\frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}+\cdots$ $R_{eq}=R_1+R_2+R_3+\cdots$ $R=\rho\frac{L}{A}$

$|\vec{F}_B|=qvB\sin\vartheta$ $|\vec{F}_B|=ILB\sin\vartheta$ $B=\frac{\mu_0 I}{2\pi r}$ $B=\mu_0 nI$ $\mathcal{E}=-N\frac{\Delta\phi}{\Delta t}$ $\phi=BA\cos\vartheta$

Some useful constants:

R_E = 6370 km M_E = 5.98×10^{24} kg $g=9.81\frac{\text{m}}{\text{s}^2}$ G = 6.67×10^{-11} N·m²/kg²

$k=8.99\times10^9\,\text{N}\frac{\text{m}^2}{\text{C}^2}$ $\epsilon_0=8.85\times10^{-12}\frac{\text{C}^2}{\text{N}\cdot\text{m}^2}$ $e=1.60\times10^{-19}$C $\mu_0=4\pi\times10^{-7}\frac{\text{T}\cdot\text{m}}{\text{A}}$

$m_e=9.11\times10^{-31}$kg $m_p=1.673\times10^{-27}$kg $m_n=1.675\times10^{-27}$kg $k=\frac{1}{4\pi\epsilon_0}$