PHY101 Exam 2 Formula Sheet

College Physics (University at Buffalo)

Factor	Prefix	Symbol	Factor	Prefix	Symbol
10^{-1}	deci-	d	10^{24}	yotta-	Y
10^{-2}	centi-	c	10^{21}	zetta-	Z
10^{-3}	milli-	m	10^{18}	exa-	E
10^{-6}	micro-	μ	10^{15}	peta-	P
10^{-9}	nano-	n	10^{12}	tera-	T
10^{-12}	pico-	p	10^{9}	giga-	G
10^{-15}	femto-	f	10^{6}	mega-	M
10^{-18}	atto-	a	10^{3}	kilo-	k
10^{-21}	zepto-	z	10^{2}	hecto-	h
10^{-24}	yocto-	y	10^{1}	deka-	da

6.5 - Circular Motion - Big Idea 4

When an object moves in a circular path, it accelerates toward the center of the path. As a result, circular motion requires a force directed toward the center.

Chapter 7

W=Fd --- SI unit: newton-meter (N·m)=joule, J

Wtotal=W1+W2+W3+⋯=∑W

Zero Distance Implies Zero Work

w/ angle --- W=(Fcosθ)d=Fdcosθ

Wtotal(Ftotalcos θ)d=Ftotal * d * cos θ *

When a force is applied to an object, its kinetic energy will change. We say that the force has transferred energy to the object and this transfer of energy is called **Work**

Kinetic Energy -

$$K = \frac{1}{2}mv^2$$

$$1 \text{ joule} = 1 \text{ J} = 1 \text{ kg} \cdot \text{m}^2/\text{s}^2$$

Kinetic energy is one-half mass times velocity squared. The total work done on an object is equal to the change in its kinetic energy.

$$W_{\text{total}} = \Delta K = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$$

Work to Stretch or Compress a Spring a Distance x from Equilibrium

$$W = \frac{1}{2}kx^2$$

SI unit: joule, J

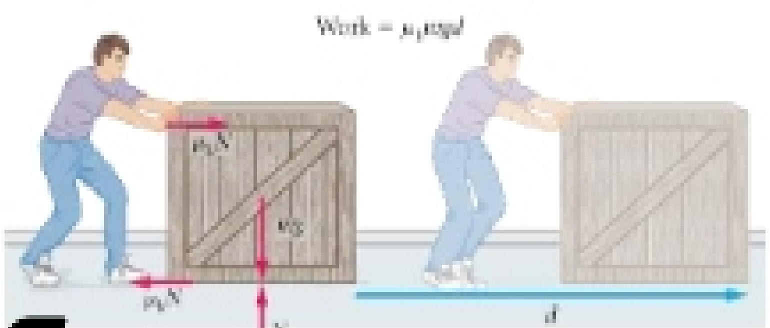
Definition of Average Power, P

P=Wt SI unit: J/s = watt, W

Power=Fυ

Chapter 8

$W_C = U_i - U_F$ U = mgy U =



1/2kx^2

Mechanical energy is the sum of the potential and kinetic energies of a system: E = U + K

The work done by a nonconservative force is equal to the change in the mechanical energy of a system: $W_{nc} = E_f - E_i$

P = mv SI unit: kg · m./s

$$X_{cm} = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2} = \frac{m_1 x_1 + m_2 x_2}{M}$$

$I = F_{av}\,\Delta t$

$F*t = p_f * p_i$

The momentum of an object is conserved (remains constant) if the net force acting on it is zero.
In an inelastic collision, the final kinetic energy is different from the initial kinetic energy.

$$\theta(\text{in radians}) = \text{arc lenth/radius} = s/r \qquad \omega = \frac{\Delta\theta}{\Delta t} = \frac{2\pi}{T} \qquad \alpha_{av} = \frac{\Delta\omega}{\Delta t}$$

$$a_{cp} = r\omega^2 \qquad a_t = r\alpha \qquad K = \frac{1}{2}I\omega^2 \qquad K = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2 \qquad L = I\omega$$

$$L = rmv\sin\theta \qquad \sum\tau = I\alpha = \frac{\Delta L}{\Delta t} \qquad F = G\frac{m_1 m_2}{r^2} \qquad g = \frac{GM_E}{{R_E}^2}$$

$$U = -G\frac{m_1 m_2}{r} \qquad E = K + U \qquad v = r\omega = vt \qquad I = \sum m_i {r_i}^2$$

$$\omega = \omega_0 + \alpha t \qquad \tau = rF$$

$$\theta = \theta_0 + \frac{1}{2}(\omega_0 + \omega)t$$

$$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2 \qquad W = \tau\Delta\theta$$

$$\omega^2 = {\omega_0}^2 + 2\alpha(\theta - \theta_0) \qquad \sum\tau = I\alpha$$

T = rFsin(theta)