Physics Formulas & Conversions Fall Final Exam

Unit 1 Speed, Velocity, & Acceleration

$$s = \frac{d}{t} \qquad v = \frac{\Delta x}{t} \qquad a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{\Delta t}$$

2.54 cm = 1 in	5280 ft = 1 mi	1.6 km = 1 mi	1600 m = 1 mi
1000 m = 1 km	100 cm = 1 m	1000 mm = 1 m	1 hr = 3600 sec

Unit 2 1-D Motion

$$V = V_i + at \qquad \Delta X = V_i t + \tfrac{1}{2} a t^2 \qquad V_f^2 = V_i^2 + 2a\Delta X$$

Unit 3 2-D Kinematics (projectile motion)

x	y
$v_x = \Delta x/t$	v_i
	v_f
	Δy
	T
	a

Resolving Vectors:

V_x = (hyp)(cos θ)
V_{iy} = (hyp)(sin θ)

Units 4, & 5 Forces

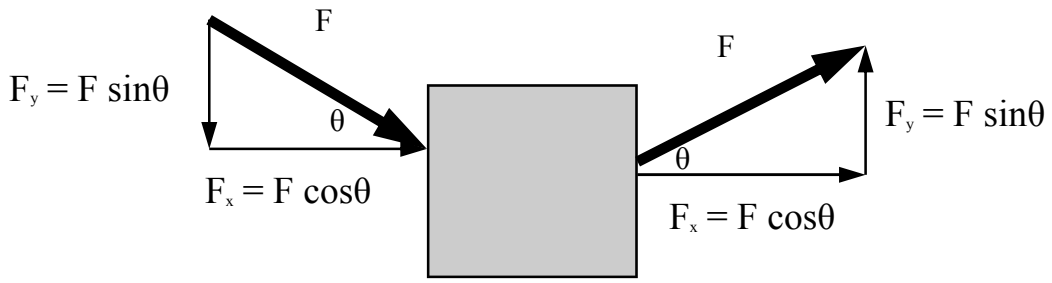
$F_g = mg$ = weight

$\Sigma F = ma$

$F_{fs} = F_N \mu_s$

$F_{fk} = F_N \mu_k$

Resolving Forces at angles:



Unit 6 Work, Energy, and Conservation of Energy

$W = Fd = mad = E = Q$

$PE_G = mgh$

$\Sigma W = \Delta KE = (1/2mv_f^2 - 1/2mv_i^2)$

(W = work, E = Energy, PE_G = gravitational potential energy, KE = kinetic energy, Q = heat)

Heat (Q) is created when work is done against friction.

$W_F = F_F d = F_N \mu d = Q_{level} = mg\mu d = Q_{incline} = mg \cos\theta \mu d$

W_F = work against friction (J)
F_F = force of friction (N)
d = distance the object covers (m)
F_N = normal force (N)
Q_{level} = heat generated when an object slides across a level surface (J)
m = mass (kg)
g = 9.8 m / s / s
μ = coefficient of friction (no units)
$Q_{incline}$ = heat generated when an object slides along an incline (J)

$KE = 1/2mv^2$

$PE_S = 1/2\ KX^2$

PE_S = spring potential energy (J)
K = spring constant (N/m)
X = displacement (m)

$F = -KX$

F = restoring force (N)
K = spring constant (N/m)
X = displacement of the spring from its normal resting position (m)

Trig Functions

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \tan\theta = \frac{\text{opposite}}{\text{adjacent}} \qquad a^2 + b^2 = c^2$$