Lists for Test 1 (updated 3/3/04)

Terms:

Mass m
Force, net force (vector sum)
Momentum: linear and angular
Velocity **v** (vs. volume V)
Speed |**v**|
Energy
Kinetic energy
Acceleration **a**
Support force (normal force)
Potential energy (gravitational)
Work: force times distance acted through
Conserved quantity
Mechanical advantage:
ratio of output force to input force
Angular velocity ω, acceleration α
Torque
Right-hand rule
Center of mass
Moment of inertia
Friction: static [no work] vs. sliding
Power (work per time)
Impulse
Spring scale
Spring constant
Equilibrium
Coefficient of restitution: ratio of
speed of separation to speed of approach
Inertial frame of reference
Uniform circular motion (UCM)
Centripetal acceleration
"Centrifugal force" [fictitious]
Pressure
Buoyant force,
Archimedes's principle
Ideal gas
Incompressible fluid
Steady-state flow
Bernoulli

New units and constants:

Gram, kilogram
Meter
Newton
Gravitational acceleration g
Joule
Watt
Radian
Newton-meter
Pascal
Absolute temperature (Kelvin): °C + 273
Boltzmann constant k_B

Laws: (cf. Important Laws & Equations)

Kinematics: $\mathbf{x}(t) = \mathbf{x}(0) + \mathbf{v}(0)\, t + \frac{1}{2}\, \mathbf{a}(0)\, t^2$
Momentum: m times **v**
Kinetic energy = ½ m times $|\mathbf{v}|^2$
Newton's 1,2,3: $\mathbf{F} = m\mathbf{a}$,
"action-reaction"
Weight = m times **g** ["downward"]
Conservation of linear, angular
momentum (pp. 69 – 70)
Elastic collision: conserv'n of kinetic energy
Rotational analogues,
torque = moment arm × force
moment of inertia:
mass times (distance from axis)^2
Hooke's law: **force** = – k times **displacement**
Centripetal acceleration: v^2/R for UCM
For UCM generally, speed = $\boldsymbol{\omega} \times \mathbf{r}$
Archimedes: buoyant force is weight of dis-
placed fluid (or gas), in opposite direction
Ideal gas: $p = (N/V)\, k_B\, T$
Bernoulli:
(Energy = PPE + KE + GPE) all over vol.
Energy/V = pressure + + ½ (m/V) $|\mathbf{v}|^2$ +
(m/V) times g times height

Boldface: vector
Italic: scalar