STUDENT ID: _____   NAME: _____

1010, Fall 2012,
Final

60 M/C Questions; Optional Long Answers Total points = 40.

For all of these problems, assume that air resistance is not important *unless* you are told otherwise.

Formulas you may or may not need.

$x = x_0 + vt$

$v = v_0 + at$

$x = x_0 + v_0 t + \frac{1}{2} at^2$

$\underline{v} = (\Delta \underline{x} / \Delta t) =$
$\quad (\underline{x}_f - \underline{x}_0) / (t_f - t_0)$

$\underline{a} = (\Delta \underline{v} / \Delta t) =$
$\quad (\underline{v}_f - \underline{v}_0) / (t_f - t_0)$

$F_{friction} = 0.3 \times weight$
$\quad$ (moving obj, eg a book on a table)

$\underline{F}_{net} = m \underline{a}$

$F_{gravity} = m g$

$\underline{F}_{spring} = -k\underline{x}$

$KE = \frac{1}{2} m v^2$

$GPE = m g h$

$W = f_{parallel} \, d$

$W_{ext} - |W_{friction}| = \Delta PE + \Delta KE$

$Power = E / t$

$PV + \frac{1}{2} mv^2 + mgh = E_{total}$

$P + \frac{1}{2} \rho v^2 + \rho gh = E_{total}/V$
$\qquad\qquad = E_{total \, per \, unit \, volume}$

$v = \lambda f \quad (light: c = \lambda f)$

$f = 1/T$

$F_c = (k \, q_A \, q_B) / r^2$

$EPE = q \Delta V$

$W_{ext} - |W_{fr}| = \Delta GPE + \Delta KE + \Delta EPE$

$\Delta V = IR$

$P = I \Delta V = I^2 R = \Delta V^2 / R$

$Power = e \, \sigma \, T^4 \, a$

$\lambda_{peak} = constant / T$

Conversions & Constants you may or may not need:

$\quad$ 1 pound = 4.45 N $\qquad$ 1 mph = 0.447 m/s $\qquad$ g = 9.8 m/s^2 (but you can use 10 m/s^2)

$\quad$ density of water = ρ_w = m / V = 1000 kg / m^3 $\quad$ Speed of light, c = 3 × 10^{8}m/s

σ = 5.67 × 10^{-8} J/(s m^2 K^4) $\qquad\qquad$ k = 8.99 × 10^9 Nm^2/C^2

charge on an electron, e = 1.6 × 10^{-19} C $\qquad$ Mass of an electron, m$_e$ = 9.11 × 10^{-31} kg

BUFF

Remember to write your name on your answer sheet. Write the color on your M/C answer sheet. Return both the answer sheet and the exam.

'On my honor as a University of Colorado at Boulder student I have neither given nor received unauthorized assistance on this work.'

Name_____

Signature _____