Quiz 3, **Version 3**: Physics 1B Spring 2012, Dr. Michelsen. You may not bring in anything written. You will be given these formulas on Quiz 3:

$G = 6.67 \times 10^{-11}$ N-m^2/kg^2 $\qquad$ $g = 9.8$ m/s^2 $\qquad$ electron mass $= 9.11 \times 10^{-31}$ kg

$k_e = 8.99 \times 10^9$ N-m^2/C^2 $\qquad$ proton charge $= +1.6 \times 10^{-19}$ C

surface area of a sphere $= 4\pi r^2$ $\qquad$ volume of a sphere $= \dfrac{4}{3}\pi r^3$ $\qquad$ $k_e = \dfrac{1}{4\pi\varepsilon_0}$

$x_f = x_i + v_i t + at^2/2$ $\qquad$ $\mathbf{F}_e = k_e \dfrac{q_1 q_2}{r^2}\hat{\mathbf{r}}_{12}$ $\qquad$ $\mathbf{E} = \mathbf{F}_e / q_0$

$\mathbf{E} = k_e \displaystyle\sum_i \dfrac{q_i}{r_i^2}\hat{\mathbf{r}}_i$ $\qquad$ $\Phi_E = \mathbf{E} \cdot \mathbf{A} = 4\pi k_e q_{in} = \dfrac{q_{in}}{\varepsilon_0}$

$\Delta V = \dfrac{\Delta U}{Q} = -\displaystyle\int_A^B \mathbf{E} \cdot d\mathbf{r}$ $\qquad$ $V(\mathbf{r}) = k_e \dfrac{q}{|\mathbf{r}|}$ $\qquad$ $C \equiv \dfrac{Q}{\Delta V} = \dfrac{\varepsilon_0 A}{d}$ $\qquad$ $U = \dfrac{1}{2}C(\Delta V)^2 = \dfrac{1}{2}\dfrac{Q^2}{C}$

$R_{tot} = R_1 + R_2$ $\qquad$ $\dfrac{1}{R_{tot}} = \dfrac{1}{R_1} + \dfrac{1}{R_2}$ $\qquad$ $C_{tot} = C_1 + C_2$ $\qquad$ $\dfrac{1}{C_{tot}} = \dfrac{1}{C_1} + \dfrac{1}{C_2}$

$P = (\Delta V)I$ $\qquad$ $\Delta V = IR$

You are expected to know Kirchoff's laws, since they follow from simple conservation principles, and the definition of current.

For this quiz, you do *not* need to know $I = nqv_d A$, but it may appear on a future quiz.