

Physics 1B Quiz 5 6/8/2012

**Directions:** Use pencil *only*. On your Scantron, you should have already blackened in your Student ID, using "1" for "A", "7" for "U", making a 9-digit number (for shame if you haven't). Fill in x in the Test Form box. Choose the one *best* answer. Questions may include more or less information than is needed, so sometimes the answer is "not enough information." *Pay close attention to the units of given numbers.*

You may find some of the following useful:

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

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

$$\text{surface area of a sphere} = 4\pi r^2 \quad \text{volume of a sphere} = \frac{4}{3}\pi r^3 \quad k_e = \frac{1}{4\pi\epsilon_0}$$

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

$$\mathbf{E} = k_e \sum_i \frac{q_i}{r_i^2} \hat{\mathbf{r}}_i \quad \Phi_E = \mathbf{E} \cdot \mathbf{A} = 4\pi k_e q_{in} = \frac{q_{in}}{\epsilon_0}$$

$$\Delta V = \frac{\Delta U}{Q} = -\int_A^B \mathbf{E} \cdot d\mathbf{r} \quad V(\mathbf{r}) = k_e \frac{q}{|\mathbf{r}|} \quad C \equiv \frac{Q}{\Delta V} = \frac{\epsilon_0 A}{d} \quad U = \frac{1}{2} C (\Delta V)^2 = \frac{1}{2} \frac{Q^2}{C}$$

$$R_{tot} = R_1 + R_2 \quad \frac{1}{R_{tot}} = \frac{1}{R_1} + \frac{1}{R_2} \quad C_{tot} = C_1 + C_2 \quad \frac{1}{C_{tot}} = \frac{1}{C_1} + \frac{1}{C_2}$$

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

$$\mathbf{F}_m = I\ell \times \mathbf{B} \quad d\mathbf{B}(\text{at } P) = k_m \frac{I d\mathbf{s} \times \hat{\mathbf{r}}}{r^2}, \quad k_m = 10^{-7} \text{ T}\cdot\text{m/A}, \quad |\mathbf{x} \times \mathbf{y}| = |\mathbf{x}||\mathbf{y}|\sin\theta$$

$$\mathbf{F}_m = q\mathbf{v} \times \mathbf{B} \quad \mathbf{F}_{total} = q(\mathbf{E} + \mathbf{v} \times \mathbf{B}) \quad \mu_0 = 4\pi \times 10^{-7} \text{ T}\cdot\text{m/A} \quad \oint_{\text{around}} \mathbf{B} \cdot d\mathbf{s} = \mu_0 I_{\text{through}}$$

$$\Phi_B \equiv \iint_{\text{area}} \mathbf{B} \cdot d\mathbf{A} \quad \mathcal{E} = \Delta V = -\frac{d\Phi_B}{dt} \quad \Delta V = B\ell v$$


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