

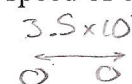
Electric Potential Quiz

Name: ky Period: _____ Date: _____

Electric Potential Energy	Electric Potential	Electric Potential Difference
$U_E = \frac{kq_1q_2}{r} = qV$	$V = k \sum_i \frac{q_i}{r_i}$	$V_{AB} = V_B - V_A$

I. Answer the following problems. Show all your work to get full credit.

1. The centers of two alpha particles are held 3.5×10^{-9} m apart, when they are released. Calculate the speed of each alpha particle when they are 0.55 m apart.


$3.5 \times 10^{-9} \text{ m}$ (1.75 $\times 10^{-9}$)


$F_E = \frac{kq_1q_2}{r^2} = \frac{(9 \times 10^9)(3.2 \times 10^{-19})^2}{(3.5 \times 10^{-9})^2} = 7.5 \times 10^{-11} \text{ N}$

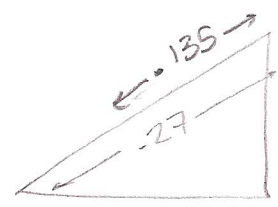
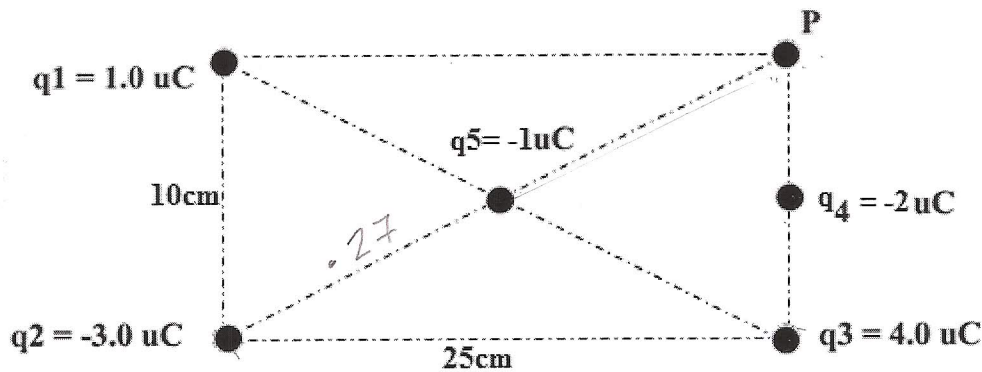
$a = \frac{F}{m} = \frac{7.5 \times 10^{-11}}{6.68 \times 10^{-27}} = 1.13 \times 10^{16} \text{ m/s}^2$

$V = \sqrt{2a(x - x_0)} = \sqrt{2(1.13 \times 10^{16})(.275 - 1.75 \times 10^{-9})}$
 $V = 7.88 \times 10^7 \text{ m/s}$

$q_{\alpha} = 2(1.6 \times 10^{-19}) = 3.2 \times 10^{-19} \text{ C}$
 $m_{\alpha} = 4(1.67 \times 10^{-27}) = 6.68 \times 10^{-27} \text{ kg}$



2. Four charges are located at the corners of a rectangle as shown below. Find the potential at point P.



$$V = 9 \times 10^9 \left[\frac{1 \times 10^{-6}}{.25} + \frac{-3 \times 10^{-6}}{.27} + \frac{4 \times 10^{-6}}{.1} + \frac{-2 \times 10^{-6}}{.05} + \frac{-1 \times 10^{-6}}{.135} \right] = -1.3 \times 10^5 \text{ V}$$

* An Alpha particle consists of 2 protons and 2 neutrons.