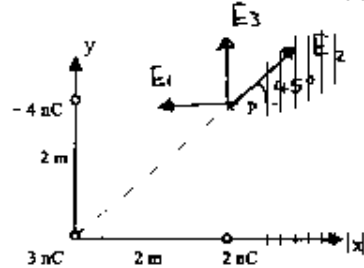


Physics 102-Rec
 Quiz # 5
 Chapter 23

Date: 14 April 2002

Name: Key Id: _____ Sect: _____

Three point charges are located as shown in the figure. What is the magnitude and direction of the electric field at the point P due to the other three charges.



$$E_1 = \frac{Kq_1}{r_1^2} = \frac{9 \times 10^9 \times 4 \times 10^{-9}}{(2)^2}$$

$$= 9 \text{ N/C}$$

$$E_2 = \frac{Kq_2}{r_2^2} = \frac{9 \times 10^9 \times 3 \times 10^{-9}}{(2\sqrt{2})^2}$$

$$= \frac{27}{8} = 3.38 \text{ N/C}$$

$$E_3 = \frac{Kq_3}{r_3^2} = \frac{9 \times 10^9 \times 2 \times 10^{-9}}{(2)^2} = 4.5 \frac{\text{N}}{\text{C}}$$

$$E_x = -E_1 + E_2 \cos 45^\circ = -9 + 3.38 \frac{\sqrt{2}}{2} = -6.6 \text{ N/C}$$

$$E_y = E_3 + E_2 \sin 45^\circ = 4.5 + 3.38 \frac{\sqrt{2}}{2} = 6.9 \text{ N/C}$$

$$\vec{E}_{\text{net}} = -6.6 \hat{i} + 6.9 \hat{j} \text{ N/C}$$

magnitude: $|\vec{E}_{\text{net}}| = \sqrt{(6.6)^2 + (6.9)^2} = 9.5 \text{ N/C}$

direction: $\theta = \tan^{-1}\left(\frac{-6.9}{6.6}\right) = -46^\circ$

