Physics 100B, Quiz 1

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Name: Standard Answer **SCORE:**

Find your solutions to the following questions. For each question, please give original formula, details of the formula with known data substituted, and the final answer.

(1) In the X and Y coordinate system, two point charges lie on the X and Y axes, respectively. The first charge Q1 of -6.2 μC is located on X axis with x= +4 cm. The second charge Q2 of 9.6 μC is located on Y axis with y=4 cm.
(a) What is the magnitude of the net electric field at the position P (x=+4cm and y=+4cm)?
(b) If a charge of Q=5.0 μC is placed at the position P, what is the magnitude of electric-static force applied on Q?

(a)

$$E_1 = k\frac{|Q_1|}{r_1^2} = 8.99\times10^9\frac{6.2\times10^{-6}}{(4\times10^{-2})^2} = 3.48\times10^7\ N/C$$

$$E_2 = k\frac{|Q_2|}{r_2^2} = 8.99\times10^9\frac{9.6\times10^{-6}}{(4\times10^{-2})^2} = 5.39\times10^7\ N/C$$

$$E_{net} = \sqrt{E_1^2+E_2^2} = 6.42\times10^7\ N/C$$

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(b)

$$F = E_{net}\cdot Q = (6.42\times10^7)\times(5.0\times10^{-6}) = 3.21\times10^2\ N$$

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