Intermediate Exam I: Problem #1 (Spring '06)

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(a) Find the electric field components E_x and E_y at point P_1.

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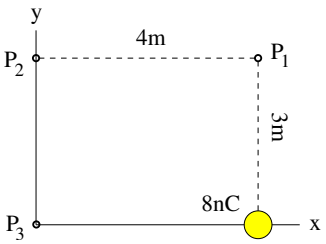

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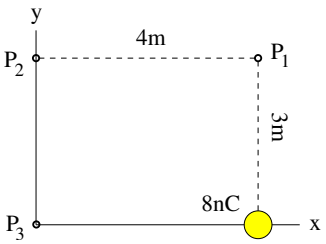

Solution:

(a) $E_x = 0, \qquad E_y = k\dfrac{8\text{nC}}{(3\text{m})^2} = 7.99\text{N/C}.$

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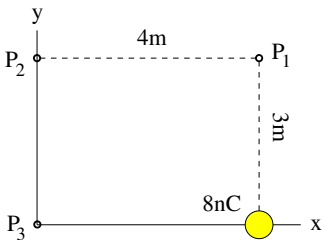

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(a) $E_x = 0, \qquad E_y = k\dfrac{8\text{nC}}{(3\text{m})^2} = 7.99\text{N/C}.$

(b) $E_x = -k\dfrac{8\text{nC}}{(5\text{m})^2}\cos\theta = -2.88\text{N/C} \times \dfrac{4}{5} = -2.30\text{N/C}.$

$E_y = k\dfrac{8\text{nC}}{(5\text{m})^2}\sin\theta = 2.88\text{N/C} \times \dfrac{3}{5} = 1.73\text{N/C}.$

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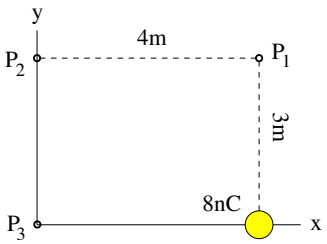

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(c) $V = k\dfrac{8\text{nC}}{4\text{m}} = 17.98\text{V}.$

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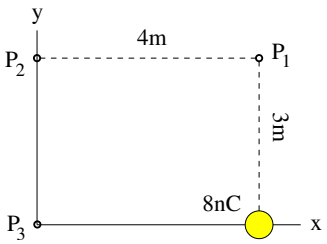

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(c) $V = k\dfrac{8\text{nC}}{4\text{m}} = 17.98\text{V}.$

(d) $V = k\dfrac{8\text{nC}}{5\text{m}} = 14.38\text{V}.$