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[← Physics 2401, section 002, Spring 2020](#)

INSTRUCTOR

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Homework Problem Set 03 (Homework)

Current Score

QUESTION	1	2	3	4	5	6	7	8	9
POINTS	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10
	✓	✓	✓	✓	✓	✓	✓	✓	✓

TOTAL SCORE

90/120

75.0%

Due Date

FRI, FEB 14, 2020

11:59 PM CST

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[Request Extension](#)**Description****Assignment Submission & Scoring****Assignment Submission**

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

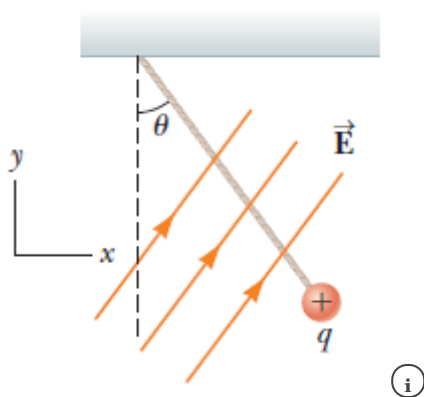
Assignment Scoring

Your last submission is used for your score.

1. **10/10 points** [Previous Answers](#) **SerPSE10 22.A.P.033.MI.**

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A charged cork ball of mass **0.50 g** is suspended on a light string in the presence of a uniform electric field as shown in the figure below. When $\vec{E} = (3.20 \hat{i} + 6.00 \hat{j}) \cdot 10^5 \text{ N/C}$, the ball is in equilibrium at $\theta = 37.0^\circ$.



(a) Find the charge on the ball.

C

(b) Find the tension in the string.

N

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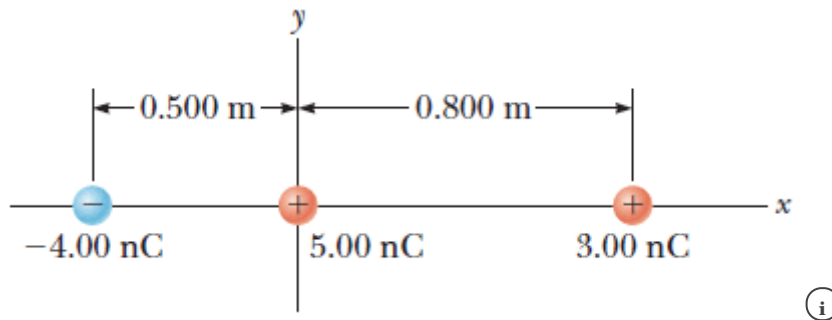
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2. 10/10 points Previous Answers SerPSE10 22.A.P.035.

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Three point charges are aligned along the x axis as shown in the figure below.



Find the electric field at the following positions.

(a) $(4.80, 0)$

$\vec{E} =$

 \hat{i}

✓ N/C

(b) $(0, 4.80)$

$\vec{E} =$

 $\hat{i} + 1.54 \hat{j}$

✓ N/C

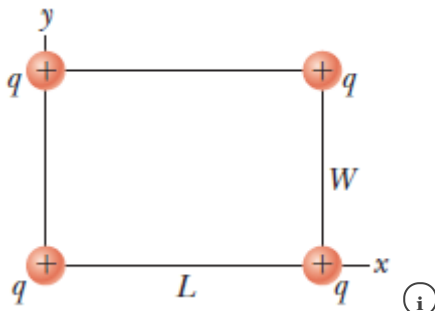
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3. 10/10 points Previous Answers SerPSE10 22.A.P.038.

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Four identical charged particles ($q = +11.0 \mu\text{C}$) are located on the corners of a rectangle as shown in the figure below. The dimensions of the rectangle are $L = 57.0 \text{ cm}$ and $W = 15.2 \text{ cm}$.



(a) Calculate the magnitude of the total electric force exerted on the charge at the lower left corner by the other three charges.

 ✓ N

(b) Calculate the direction of the total electric force exerted on the charge at the lower left corner by the other three charges.

 ✓ ° (counterclockwise from the +x-axis)

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4. 10/10 points Previous Answers SerPSE10 23.1.OP.001.

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A rod 12.0 cm long is uniformly charged and has a total charge of $-24.0 \mu\text{C}$. Determine the magnitude and direction of the electric field along the axis of the rod at a point 36.0 cm from its center.

 magnitude ✓ N/C

 direction ✓

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5. 10/10 points Previous Answers SerPSE10 23.1.OP.002.

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A uniformly charged disk with radius $R = 30.0$ cm and uniform charge density $\sigma = 8.80 \times 10^{-3}$ C/m² lies in the xy -plane, with its center at the origin. What is the electric field (in MN/C) due to the charged disk at the following locations?

(a) $z = 5.00$ cm ✓ MN/C(b) $z = 10.0$ cm ✓ MN/C(c) $z = 50.0$ cm ✓ MN/C(d) $z = 200$ cm ✓ MN/C

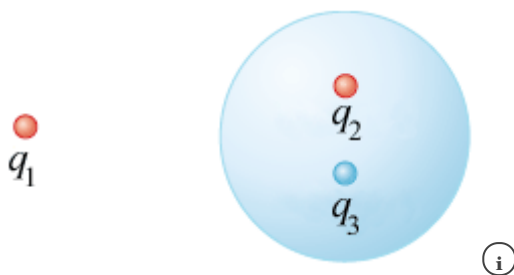
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6. 10/10 points Previous Answers SerPSE10 23.3.P.014.

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Find the net electric flux through the spherical closed surface shown in the figure below. The two charges on the right are inside the spherical surface. (Take $q_1 = +2.08$ nC, $q_2 = +1.04$ nC, and $q_3 = -2.85$ nC.)

 ✓ N · m²/C

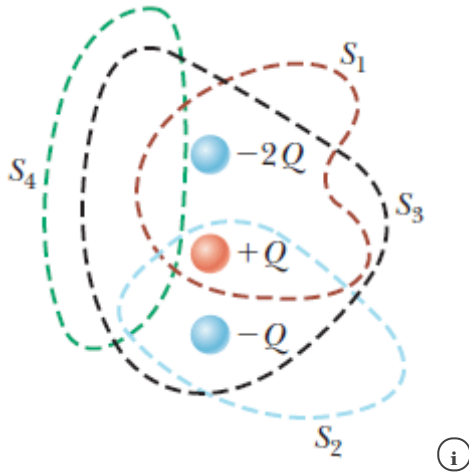
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7. 10/10 points Previous Answers SerPSE10 23.3.P.015.

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Four closed surfaces, S_1 through S_4 , together with the charges $-2Q$, Q , and $-Q$ are sketched in the figure below. (The colored lines are the intersections of the surfaces with the page.) Find the electric flux through each surface. (Use the following as necessary: ϵ_0 and Q .)



$$\Phi_{S1} = \frac{\quad}{\quad} - Q\epsilon_0$$



$$\Phi_{S2} = \frac{\quad}{\quad} 0$$



$$\Phi_{S3} = \frac{\quad}{\quad} - 2Q\epsilon_0$$



$$\Phi_{S4} = \frac{\quad}{\quad} 0$$



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8. 10/10 points Previous Answers SerPSE10 23.4.P.027.MI.

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A large, flat, horizontal sheet of charge has a charge per unit area of $6.50 \mu\text{C}/\text{m}^2$. Find the electric field just above the middle of the sheet.

magnitude ✓ kN/Cdirection ✓

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9. 10/10 points Previous Answers SerPSE10 23.4.P.029.MI.

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A uniformly charged, straight filament 7.30 m in length has a total positive charge of $2.00 \mu\text{C}$. An uncharged cardboard cylinder 1.10 cm in length and 10.0 cm in radius surrounds the filament at its center, with the filament as the axis of the cylinder.

(a) Using reasonable approximations, find the electric field at the surface of the cylinder.

magnitude ✓ kN/Cdirection ✓

(b) Using reasonable approximations, find the total electric flux through the cylinder.

 ✓ $\text{N} \cdot \text{m}^2/\text{C}$

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