CENGAGE | WEBASSIGN

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(sign out)



← PHYS-2B, section 34945, Spring 2020

INSTRUCTOR
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Fresno

# Resistance and More Potential (Homework)

## Current Score

| QUESTION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINTS | 3/3 | 8/8 | 3/3 | 4/4 | 5/5 | 4/4 | 2/2 | 2/2 | 1/5 | 1/1 | 2/2 | 2/2 |

**TOTAL SCORE**

| 37/41 | 90.2% |
|---|---|

## Due Date Past Due

**WED, FEB 19, 2020**
11:59 PM PST

Request Extension

## 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.

**The due date for this assignment has passed.**

Your work can be viewed below, but no changes can be made.

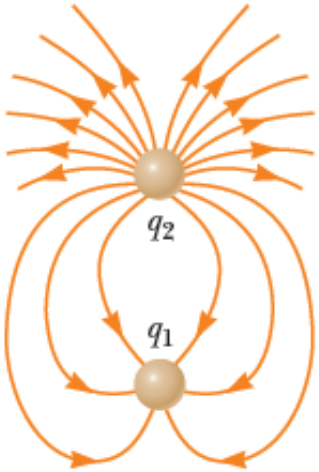
**Important!** Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may not grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension | View Key

1. 3/3 points | Previous Answers **SERCP11 15.5.OP.034.**

My Notes | Ask Your Teacher

In the figure below, the electric field lines for two charged particles are shown. The lower particle has charge $q_1$, while the upper particle has charge $q_2$.




(a) Which charge is larger in magnitude?

- ○ $q_1$
- ◉ $q_2$
- ○ The charges are equal in magnitude.

✔

(b) What is the sign of $q_1$?

- ○ positive
- ◉ negative
- ○ The magnitude is zero.

✔

(c) What is the sign of $q_2$?

- ◉ positive
- ○ negative
- ○ The magnitude is zero.

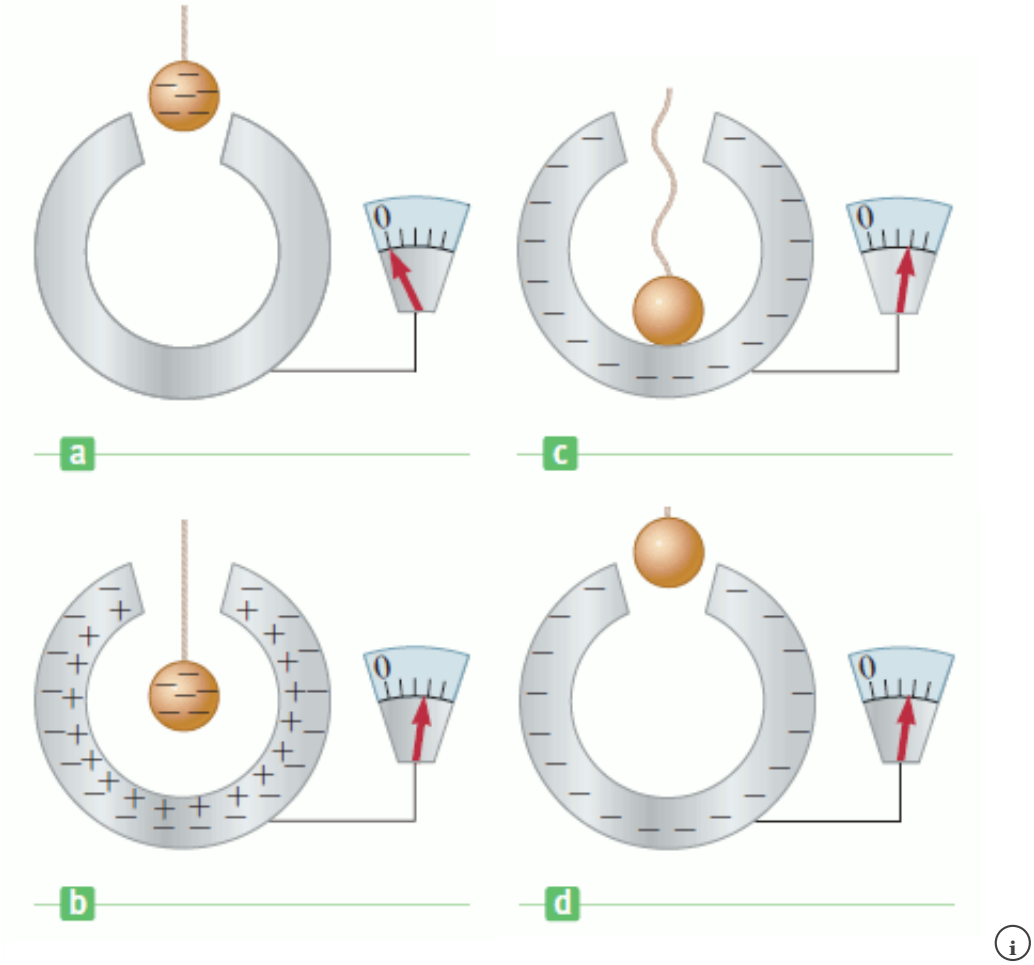
✔

Need Help? Read It

2. 8/8 points Previous Answers SERCP11 15.5.P.039.

My Notes Ask Your Teacher

Refer to the figure below. The charge lowered into the center of the hollow conductor has a magnitude of 4.6 μC. Find the magnitude and sign of the charge on the inside and outside of the hollow conductor when the charge is as shown in the following images.




(a) Figure (a)

Inside: 0 ✓ μC

Outside: 0 ✓ μC

(b) Figure (b)

Inside: 4.6 ✔ μC

Outside: -4.6 ✔ μC

(c) Figure (c)

Inside: 0 ✔ μC

Outside: -4.6 ✔ μC

(d) Figure (d)

Inside: 0 ✔ μC

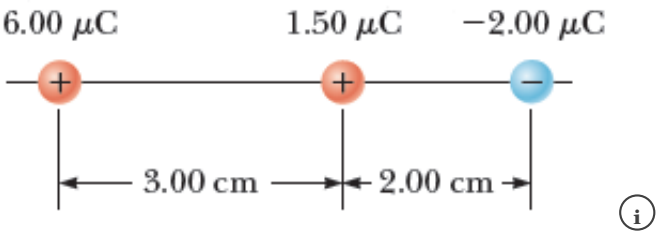
Outside: -4.6 ✔ μC

Need Help? Read It

3. 3/3 points Previous Answers **SERCP11 15.3.P.018.**

My Notes Ask Your Teacher

(a) Determine the electric field strength at a point 1.00 cm to the left of the middle charge shown in the figure below. (Enter the magnitude of the electric field only.)




2e7 ✓ N/C

(b) If a charge of −4.70 μC is placed at this point, what are the magnitude and direction of the force on it?

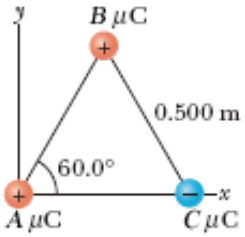
magnitude 94 ✓ N

direction toward the left ✓

Need Help? Read It

4. 4/4 points Previous Answers **SERCP11 15.3.P.024.**

My Notes Ask Your Teacher




(a) Three point charges, $A$ = 1.80 μC, $B$ = 6.70 μC, and $C$ = −3.95 μC, are located at the corners of an equilateral triangle as in the figure above. Find the magnitude and direction of the electric field at the position of the 1.80 μC charge.

magnitude 2.10e5 ✓ N/C

direction 84.1 ✓ ° below the +$x$-axis

(b) How would the electric field at that point be affected if the charge there were doubled?

- ○ The magnitude of the field would be halved.
- ◉ The field would be unchanged. ✓
- ○ The magnitude of the field would double.
- ○ The magnitude of the field would quadruple.

Would the magnitude of the electric force be affected?

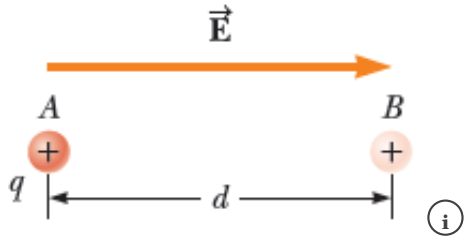
- ◉ Yes ✓
- ○ No

Need Help? Read It

5. 5/5 points Previous Answers **SERCP11 16.1.OP.006.**

My Notes Ask Your Teacher

The figure below shows a small, charged sphere, with a charge of $q$ = +44.0 nC, that moves a distance of $d$ = 0.189 m from point $A$ to point $B$ in the presence of a uniform electric field $\vec{\mathbf{E}}$ of magnitude 260 N/C, pointing right.




(a) What is the magnitude (in N) and direction of the electric force on the sphere?

magnitude 1.14e-5 ✓ N

direction toward the right ✓

(b) What is the work (in J) done on the sphere by the electric force as it moves from $A$ to $B$?

2.15e-6 ✓ J

(c) What is the change of the electric potential energy (in J) as the sphere moves from $A$ to $B$? (The system consists of the sphere and all its surroundings.)

$PE_B - PE_A$ = -2.15e-6 ✓ J

(d) What is the potential difference (in V) between $A$ and $B$?

$V_B - V_A$ = -48.9 ✓ V

Need Help? Read It

6. 4/4 points Previous Answers **SERCP11 16.1.P.001.**

My Notes Ask Your Teacher

A uniform electric field of magnitude 369 N/C pointing in the positive *x*-direction acts on an electron, which is initially at rest. The electron has moved 3.50 cm.

(a) What is the work done by the field on the electron?
2.07e-18 ✓ J

(b) What is the change in potential energy associated with the electron?
-2.07e-18 ✓ J

(c) What is the velocity of the electron?
magnitude 2.13e6 ✓ m/s
direction -*x* ✓

Need Help? Read It

7. 2/2 points Previous Answers **SERCP11 16.1.P.009.**

My Notes Ask Your Teacher

An ionized oxygen molecule ($O_2^+$) at point A has charge $+e$ and moves at $1.32 \times 10^3$ m/s in the positive $x$-direction. A constant electric force in the negative $x$-direction slows the molecule to a stop at point B, a distance of 0.931 mm past A on the $x$-axis. Calculate the $x$-component of the electric field and the potential difference between points A and B. (The mass of an oxygen molecule is $5.31 \times 10^{-26}$ kg and the fundamental charge is $e = 1.60 \times 10^{-19}$ C.)

HINT

(a) the $x$-component of the electric field (in V/m)

-311 ✓ The SI unit for electric field is newtons per coulomb (N/C), which is equivalent to volts per meter (V/m). V/m

(b) the potential difference between points A and B (in V)

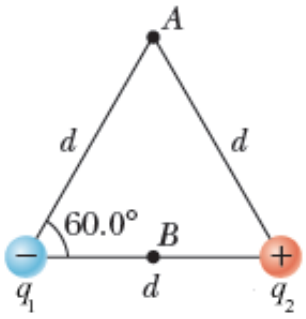
0.2895 ✓ V

Need Help? Read It Watch It

8. 2/2 points Previous Answers **SERCP11 16.2.OP.012.**

My Notes Ask Your Teacher

The figure below shows two small, charged spheres separated by a distance of $d$ = 2.50 cm. The charges are $q_1$ = −20.0 nC and $q_2$ = 30.0 nC. Point $B$ is at the midpoint between the two charges, and point $A$ is at the peak of an equilateral triangle, with each side of length $d$, as shown. (Assume the zero of electric potential is at infinity.)




(a) What is the electric potential (in kV) at point $A$?

3.6 ✓ kV

(b) What is the electric potential (in kV) at point $B$?

7.2 ✓ kV

Need Help? Read It

9. 1/5 points Previous Answers **SERCP11 16.2.P.019.**

My Notes Ask Your Teacher

A proton is located at the origin, and a second proton is located on the $x$-axis at $x_1$ = 6.66 fm (1 fm = $10^{-15}$ m).

(a) Calculate the electric potential energy associated with this configuration.
3.46e-14 ✓ J

(b) An alpha particle (charge = $2e$, mass = 6.64 × $10^{-27}$ kg) is now placed at ($x_2$, $y_2$) = (3.33, 3.33) fm. Calculate the electric potential energy associated with this configuration.
1.22e-13 ✗
Your response differs from the correct answer by more than 10%. Double check your calculations. J

(c) Starting with the three particle system, find the change in electric potential energy if the alpha particle is allowed to escape to infinity while the two protons remain fixed in place. (Throughout, neglect any radiation effects.)
*(No Response)* J

(d) Use conservation of energy to calculate the speed of the alpha particle at infinity.
*(No Response)* m/s

(e) If the two protons are released from rest and the alpha particle remains fixed, calculate the speed of the protons at infinity.
*(No Response)* m/s

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10. 1/1 points | Previous Answers | SERCP11 17.4.OP.010.

My Notes | Ask Your Teacher

The potential difference across a resistor in a particular electric circuit is 300 V. The current through the resistor is 15.0 A. What is its resistance (in Ω)?

20 ✓ Ω

Need Help? Read It

11. 2/2 points | Previous Answers | SERCP11 17.4.OP.014.

My Notes | Ask Your Teacher

A gold wire with a circular cross-section has a mass of 1.20 g and a resistance of 0.710 Ω. At 20°C, the resistivity of gold is $2.44 \times 10^{-8}$ Ω · m and its density is 19,300 kg/m$^3$.

How long (in m) is the wire?

1.35 ✓ m

What is the diameter (in mm) of the wire?

.242 ✓ mm

Need Help? Read It

12. 2/2 points Previous Answers SERCP11 17.4.OP.017.

My Notes Ask Your Teacher

A long wire with a radius of 0.400 cm carries a current. The potential difference across a 2.80 m long section of this wire is 14.0 V, and the wire carries a current of 0.390 A.

(a) What is the resistance (in Ω) of the 2.80 m long section of wire?

35.9 Ω

(b) What is the resistivity (in Ω · m) of the wire?

6.44e-4 Ω · m

Need Help? Read It

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