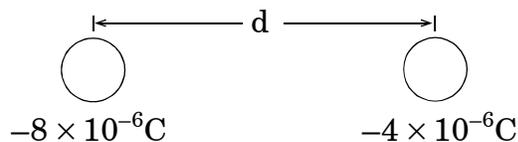


1. When placed between the positive and negative terminals of a discharge tube, which would move toward the positive terminal?
- A a proton
 - B a neutron
 - C an electron
 - D an oxygen atom
2. Other than their charges, two conducting spheres are identical. These spheres initially have charges of $-2 \mu\text{C}$ and $8 \mu\text{C}$. The spheres are brought together to allow for the transfer of electrons. What is the identical charge on each of the spheres after they are separated?
- A $0 \mu\text{C}$
 - B $3 \mu\text{C}$
 - C $5 \mu\text{C}$
 - D $6 \mu\text{C}$
3. A balloon is rubbed back and forth across a person's hair. Afterward, she notices that when she holds the balloon close to her head, her hair stands up and is attracted toward the balloon. The balloon and hair were neutral before coming in contact with one another. As she is rubbing the balloon back and forth across her hair, which explanation *best* describes what is occurring with the electrical charges?
- A The hair and balloon have no change in electrical charges.
 - B The balloon's electrons are pulled to the outer surface of the balloon, and a charge is created.
 - C The balloon gains a negative charge from the hair while the hair is left with positive charges.
 - D The balloon rubs electrons off the hair and destroys the negative charges the hair once had, leaving only positive charges.

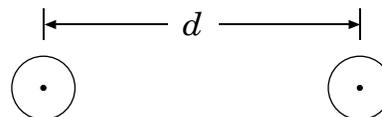
4. Two identical metal conductors carrying charges $-8 \times 10^{-6} \text{ C}$ and $-4 \times 10^{-6} \text{ C}$ are placed as shown below. They are then touched and separated by the same distance.



Which statement is true about the behavior of the two conductors?

- A They repel each other before touching and attract each other after touching.
- B They attract each other before touching and repel each other after touching.
- C They attract each other before touching and attract each other after touching.
- D They repel each other before touching and repel each other after touching.

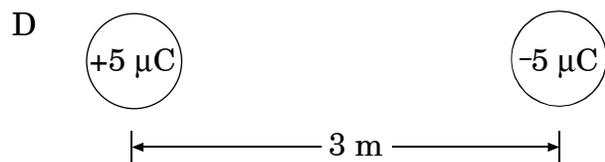
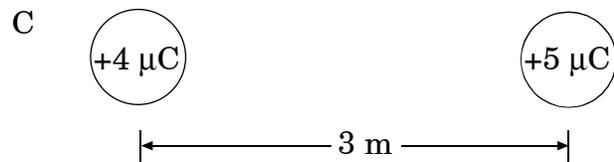
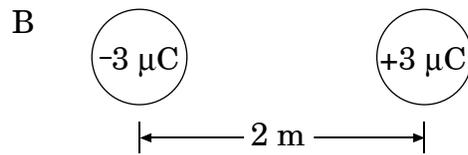
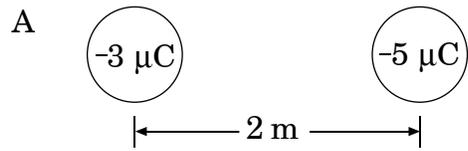
5. Two charged spheres separated by a distance, d , exert a force of F Newtons on each other.



The distance between the spheres is doubled and the magnitude of the charge of one sphere is doubled. What is the magnitude of the resulting force in comparison to the original force, F ?

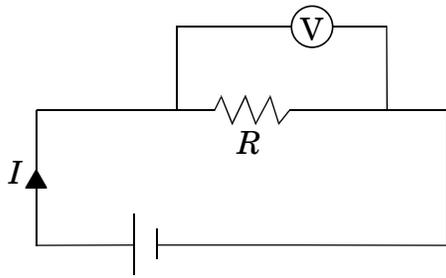
- A $4F$
- B $2F$
- C $\frac{F}{2}$
- D $\frac{F}{4}$

6. Which set of charges will experience the ***greatest*** magnitude of electrostatic force between them?

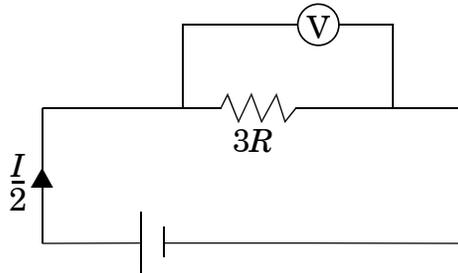


7. In which circuit does the voltmeter read the *greatest* value?

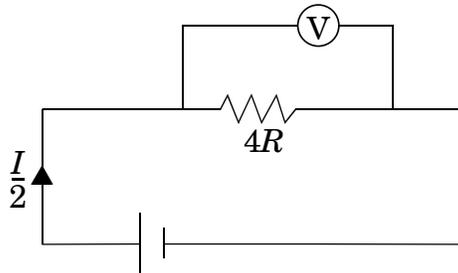
A



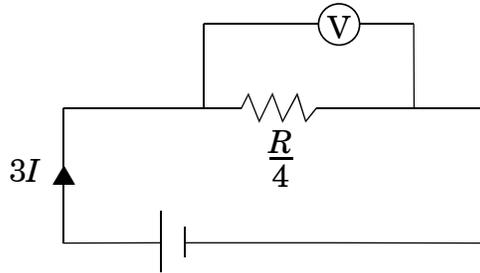
B



C



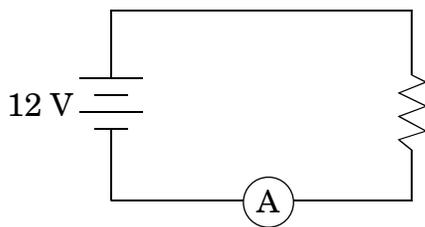
D



8. A heater has a resistance of $10.0\ \Omega$. It operates on $120.0\ \text{V}$. What is the current through the resistance?

A $120.\ \text{A}$
 B $80.0\ \text{A}$
 C $24.0\ \text{A}$
 D $12.0\ \text{A}$

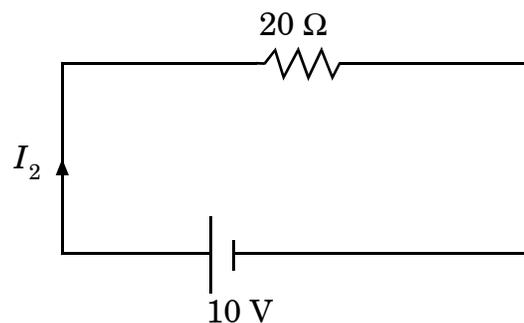
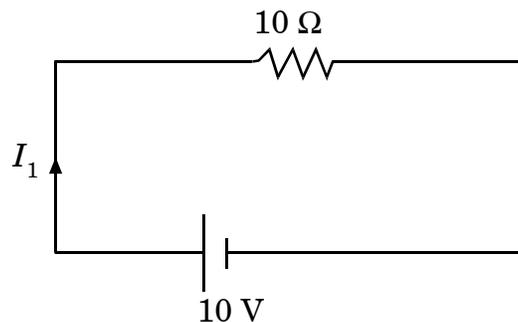
9. A small light bulb is placed across a 12.0-V battery, as shown.



The ammeter in the circuit reads $0.200\ \text{amp}$. What must be the resistance of the bulb? (Assume no internal resistance in the battery.)

A $0.0170\ \Omega$
 B $2.40\ \Omega$
 C $24.0\ \Omega$
 D $60.0\ \Omega$

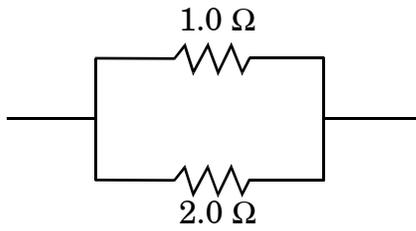
10. What is the relationship between I_1 and I_2 ?



A $I_1 = 4I_2$
 B $I_1 = 2I_2$
 C $I_2 = 2I_1$
 D $I_2 = 4I_1$

11. Which set of resistors has the *smallest* equivalent resistance?

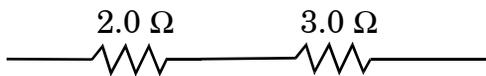
A



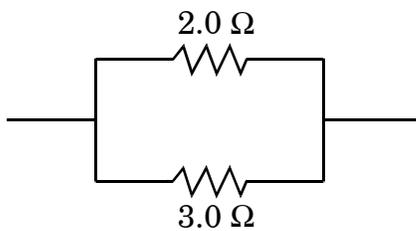
B



C



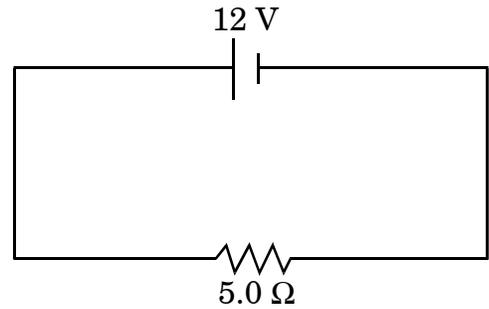
D



12. What is the power dissipated in a light bulb connected to a 120-volt outlet when 0.50 ampere flows through it?

- A 0.0042 W
- B 60. W
- C 240 W
- D 7,200 W

13. What is the power dissipated in the resistor in the circuit below?



- A 2.4 W
- B 14 W
- C 29 W
- D 60. W

End of Goal 8 Sample Items

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**Physics Goal 8
Sample Items Key Report**

| | | | | |
|----|------------------------|---|------------------------|---|
| | Thinking Skill: | Integrating | Correct Answer: | A |
| 7 | Objective: | 8.02 | | |
| | | Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit. | | |
| | Thinking Skill: | N/A | Correct Answer: | C |
| 8 | Objective: | 8.02 | | |
| | | Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit. | | |
| | Thinking Skill: | Knowledge | Correct Answer: | D |
| 9 | Objective: | 8.02 | | |
| | | Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit. | | |
| | Thinking Skill: | Integrating | Correct Answer: | D |
| 10 | Objective: | 8.02 | | |
| | | Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit. | | |
| | Thinking Skill: | Knowledge | Correct Answer: | B |
| 11 | Objective: | 8.03 | | |
| | | Analyze and measure the relationship among current, voltage, and resistance in circuits. | | |
| | | a. Series. | | |
| | | b. Parallel. | | |
| | | c. Series-parallel combinations. | | |
| | Thinking Skill: | Knowledge | Correct Answer: | A |
| 12 | Objective: | 8.04 | | |
| | | Analyze and measure the nature of power in an electrical circuit. | | |
| | Thinking Skill: | Integrating | Correct Answer: | B |
| 13 | Objective: | 8.04 | | |
| | | Analyze and measure the nature of power in an electrical circuit. | | |
| | Thinking Skill: | Integrating | Correct Answer: | C |