Halliday/Resnick/Walker Fundamentals of Physics 8th edition

Classroom Response System Questions

Chapter 27 Circuits

Interactive Lecture Questions

27.3.1. In physics lab, two students measured the potential difference between the terminals of a battery and the current in a circuit connected to the battery. The students then made a graph of the two parameters as shown. They then drew a best fit line through the data. From their results, determine the approximate internal resistance of the battery.

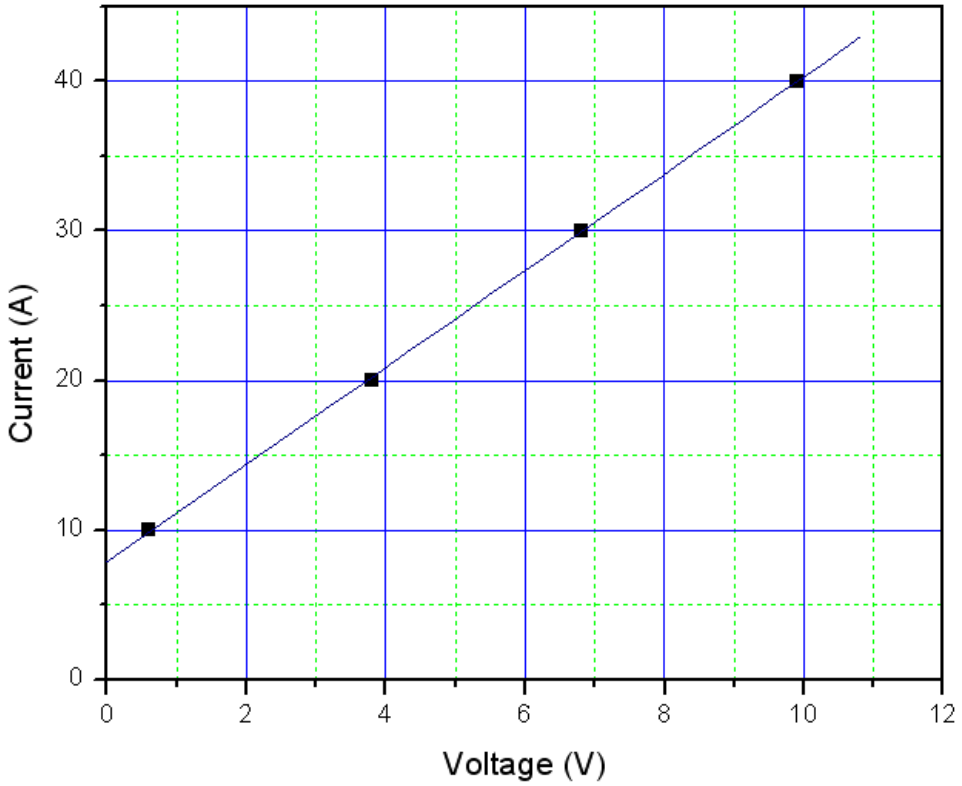
a) 0.002 Ω

b) 0.08 Ω

c) 0.1 Ω

d) 0.3 Ω

e) 0.6 Ω



27.4.1. Consider a circuit that contains an ideal battery and a resistor to form a complete circuit. Which one of the following statements concerning the work done by the battery is true?

a) No work is done by the battery in such a circuit.

b) The work done is equal to the thermal energy dissipated by the resistor.

c) The work done is equal to the work needed to move a single charge from one side of the battery to the other.

d) The work done is equal to the emf of the battery.

e) The work done is equal to the product of the current flowing through the circuit and the resistor.

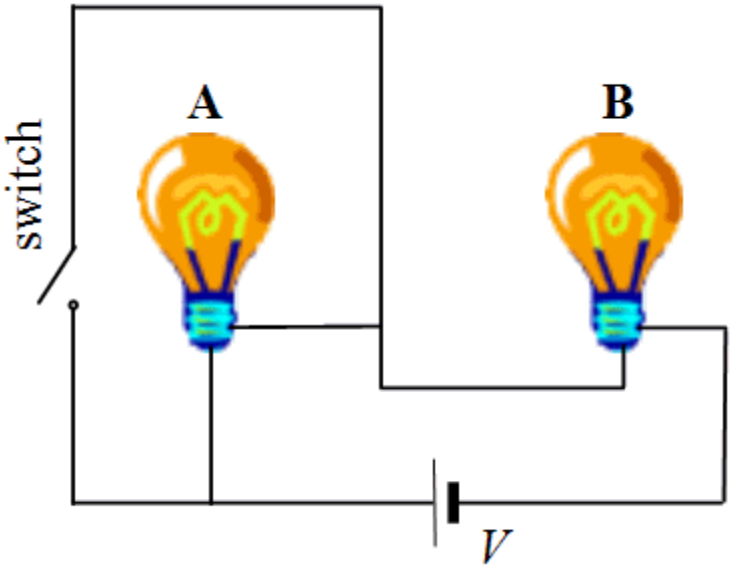
27.5.2. Consider the circuit shown in the drawing. Two identical light bulbs, labeled A and B, are connected in series with a battery and are illuminated equally. There is a switch in the circuit that is initially open. Which one of the following statements concerning the two bulbs is true after the switch is closed?

a) Bulbs A and B will be off.

b) Bulbs A and B will be equally illuminated.

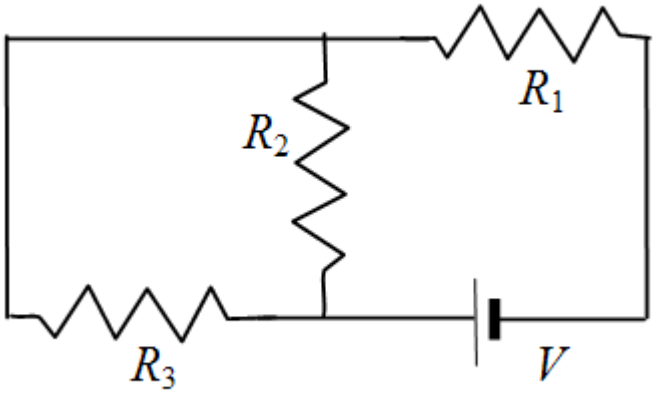
c) Bulb A will be brighter and bulb B will be off.

d) Bulb A will be off and bulb B will be brighter.



e) Both bulbs will be dimmer than before the switch was closed.

27.5.3. Consider the three resistors and the battery in the circuit shown. Which resistors, if any, are connected in series?



a) R_1 and R_2

b) R_1 and R_3

c) R_2 and R_3

d) R_1 and R_2 and R_3

e) No resistors are connected in series.

27.5.4. Consider the circuit shown. If the ideal emf in the circuit is 24 V and the three resistances are $R1 = 2.5\ \Omega$, $R2 = 4.0\ \Omega$, and $R3 = 6.0\ \Omega$, determine the current in the 4.0 Ω resistor.

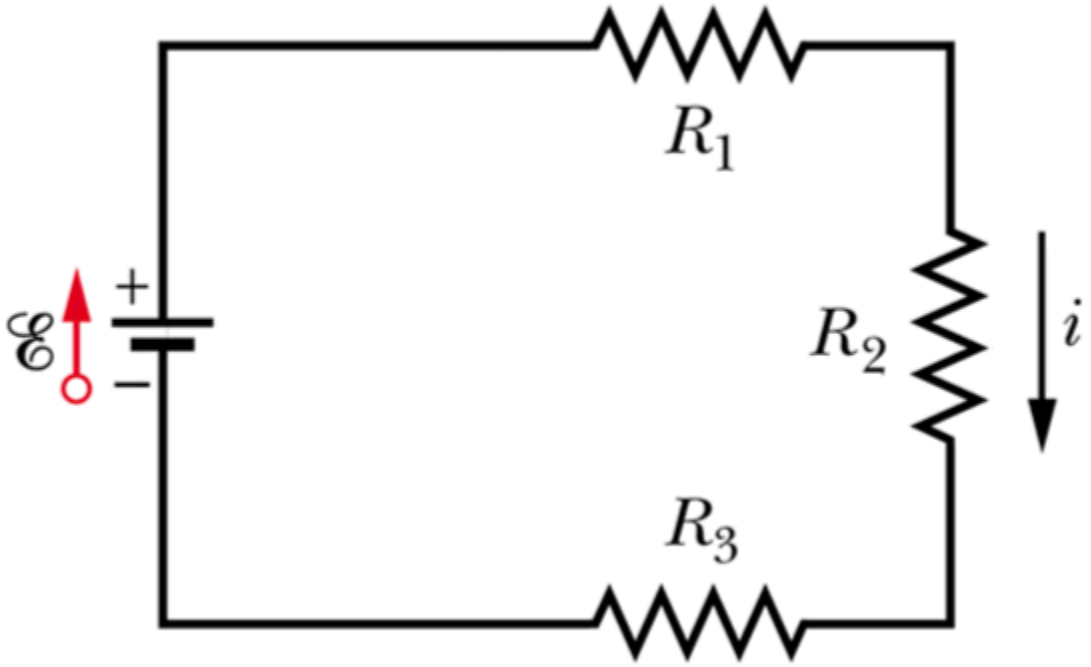
a) 1.2 A

b) 1.9 A

c) 4.0 A

d) 6.0 A

e) 6.5 A



27.7.2. Consider the three resistors and the battery in the circuit shown. Which resistors, if any, are connected in parallel?

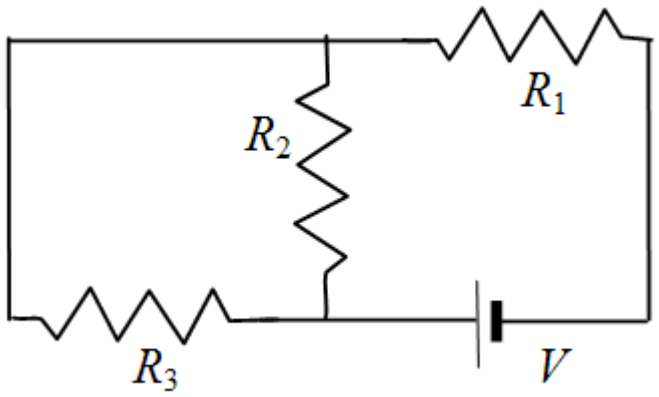
a) R_1 and R_2

b) R_1 and R_3

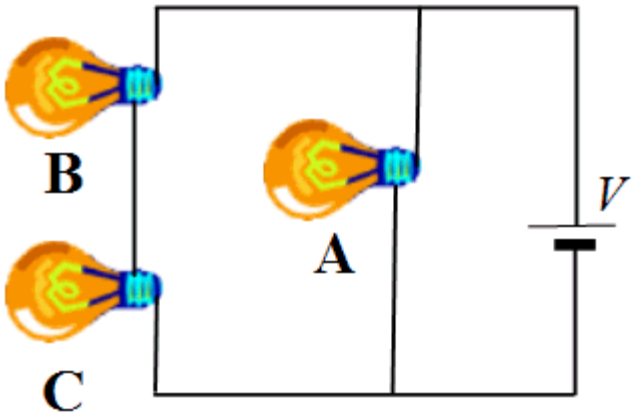
c) R_2 and R_3

d) R_1 and R_2 and R_3

e) No resistors are connected in parallel.



27.7.5. Consider the three identical light bulbs shown in the circuit. Bulbs B and C are wired in series with each other and are wired in parallel with bulb A. When the bulbs are connected to the battery as shown, how does the brightness of each bulb compare to the others?



a) Bulbs B and C are equally bright, but bulb A is less bright.

b) Bulbs B and C are equally bright, but less bright than bulb A.

c) All three bulbs are equally bright.

d) Bulbs A and B are equally bright, but bulb C is less bright.

e) Only bulb A is illuminated.

27.7.7. What is the approximate equivalent resistance of the five resistors shown in the circuit?

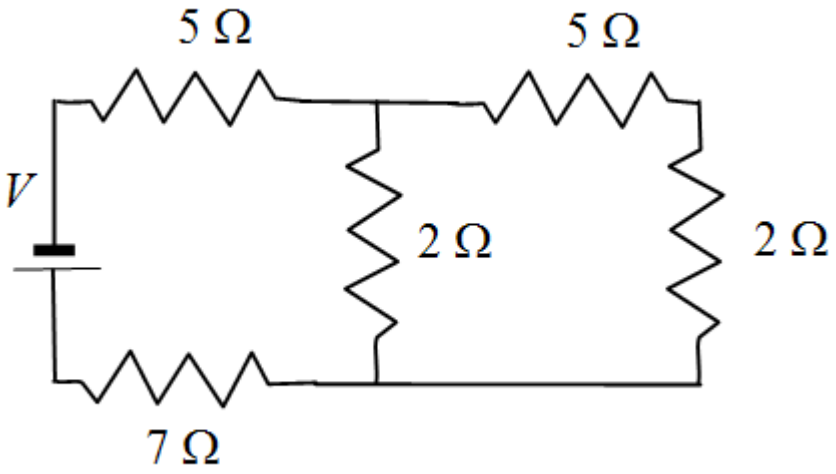
a) 21 Ω

b) 7 Ω

c) 11 Ω

d) 14 Ω

e) 19 Ω



27.9.1. What effect, if any, does increasing the battery emf in an RC circuit have on the time to charge the capacitor?

a) The charging time will decrease because the rate of charge flowing to the plates will increase.

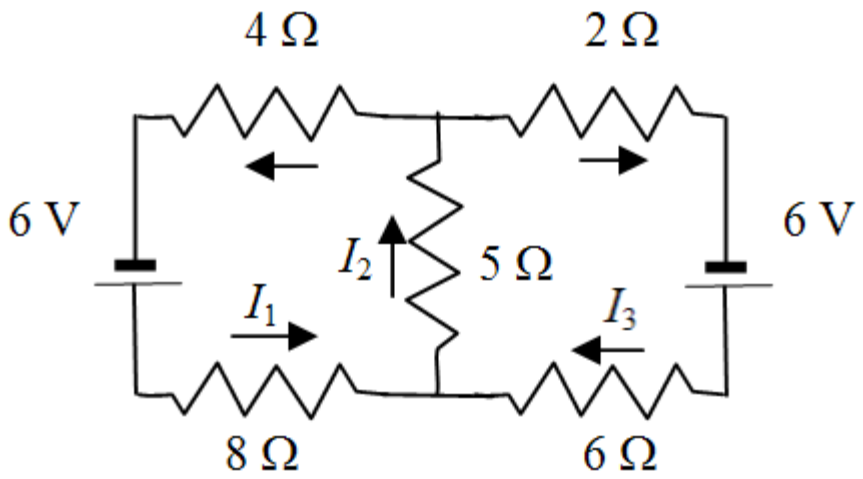
b) The charging time will decrease because the rate of charge flowing to the plates will decrease.

c) The charging time will not change because the charging time does not depend on the battery emf.

d) The charging time will increase because the emf is increased.

e) The charging time will decrease because potential difference across the plates will be larger.

27.7.10. Which one of the following equations is not correct relative to the other four equations determined by applying Kirchoff's Rules to the circuit shown?



a) $I_2 = I_1 + I_4$

b) $I_2 = I_3 + I_5$

c) $6\ \text{V} - (8\ \Omega)\, I_1 - (5\ \Omega)\, I_2 - (4\ \Omega)\, I_3 = 0$

d) $6\ \text{V} - (6\ \Omega)\, I_4 - (5\ \Omega)\, I_2 - (2\ \Omega)\, I_5 = 0$

e) $6\ \text{V} - (8\ \Omega)\, I_1 - (6\ \Omega)\, I_4 - 6\ \text{V} - (2\ \Omega)\, I_5 - (4\ \Omega)\, I_3 = 0$