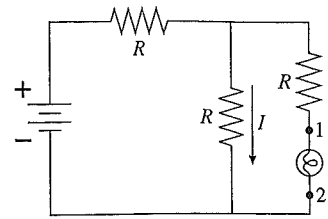


26. Initially the lightbulb is glowing. It is then removed from its socket.  
 a. What happens to the current  $I$  when the bulb is removed? Does it increase, stay the same, or decrease? Explain.




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- b. What happens to the potential difference  $\Delta V_{12}$  between points 1 and 2? Does it increase, stay the same, decrease, or become zero? Explain.

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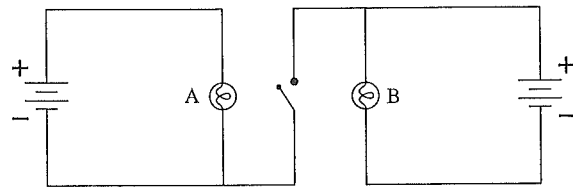


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27. Bulbs A and B are identical and initially both are glowing. Then the switch is closed. What happens to each bulb? Does its brightness increase, stay the same, decrease, or go out? Explain.




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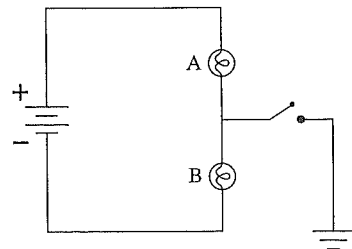


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28. Bulbs A and B are identical and initially both are glowing. Then the switch is closed. What happens to each bulb? Does its brightness increase, stay the same, decrease, or go out? Explain.




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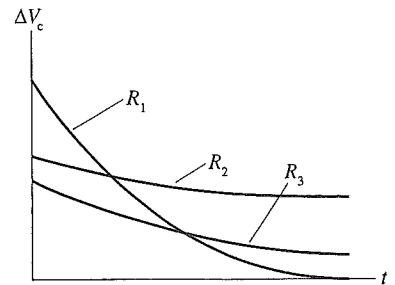
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### 32.9 RC Circuits

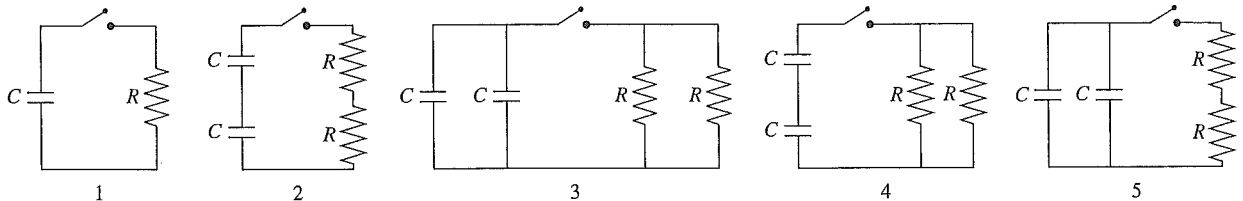
29. The graph shows the voltage as a function of time on a capacitor as it is discharged (separately) through three different resistors. Rank in order, from largest to smallest, the values of the resistances  $R_1$  to  $R_3$ .



Order:

Explanation:

30. The capacitors in each circuit are discharged when the switch closes at  $t = 0$  s. Rank in order, from largest to smallest, the time constants  $\tau_1$  to  $\tau_5$  with which each circuit will discharge.



Order:

Explanation:

31. The charge on the capacitor is zero when the switch closes at  $t = 0$  s.

a. What will be the current in the circuit after the switch has been closed for a long time? Explain.

b. Immediately after the switch closes, before the capacitor has had time to charge, the potential difference across the capacitor is zero. What must be the potential difference across the resistor in order to satisfy Kirchhoff's loop law? Explain.

c. Based on your answer to part b, what is the current in the circuit immediately after the switch closes?

d. Sketch a graph of current versus time, starting from just before  $t = 0$  s and continuing until the switch has been closed a long time. There are no numerical values for the horizontal axis, so you should think about the *shape* of the graph.

