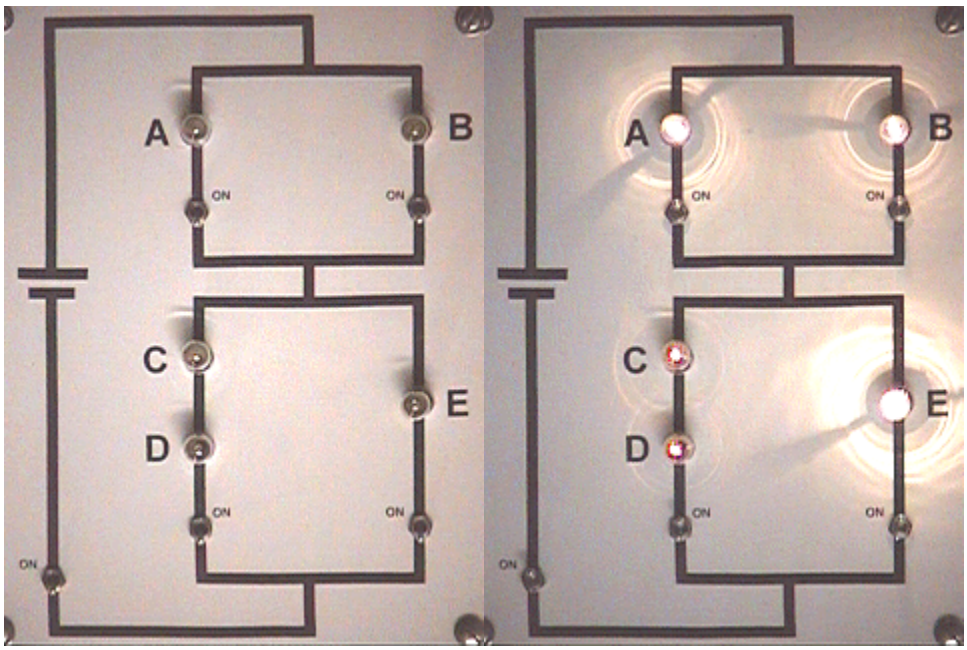
Answer #60

The answer is: E > A = B > C = D, as seen in the photograph at the right below.



In order to see why, let's do a series of problems, starting with route 1 or route 2.

NOTES ON THE CIRCUIT:

In carrying out this exercise, we have assumed that light bulbs are "linear" devices, so that additional current makes the bulb uniformly brighter and vice versa. We would like the resistance of the bulbs to be sufficiently linear that the brightness of the bulbs is visible for the circuit in any configuration - over a large current range. This is not necessarily the case.

We have therefore "fixed" the system, at least in part, by putting a resistor in parallel with each light bulb, reducing the extremes in response due to varying resistance caused by temperature changes. In our demonstration experiment we use three 1.5 volt size D flashlight batteries in series, 1.5 volt flashlight bulbs, and 10 ohm resistors.

Although this limits the extremes of brightness of the bulbs, it does not change the relative brightness relations as requested in the problem.

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.