PH 223 Week 5
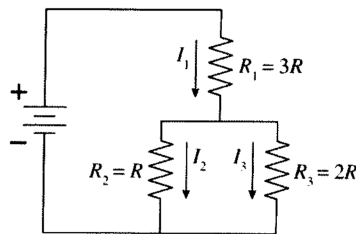
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These problems are borrowed/adapted from Chapter 28 of the *Student Workbook* for *Physics for Scientists and Engineers.*
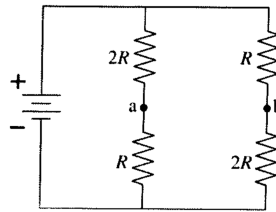
Activity 1

Rank in order, from largest to smallest, the three currents I_1 to I_3.
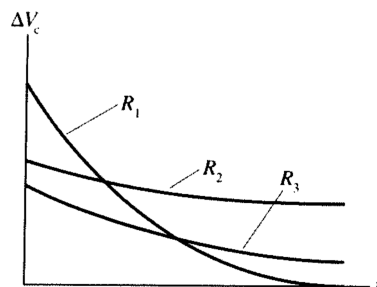

Activity 2

(a) Consider the points a and b. Is the potential difference $\Delta V_{ab} = 0$? If so, why? If not, which point is more positive?

(b) If a wire is connected between points a and b, does a current flow through it? If so, in which direction—to the right or to the left? Explain.
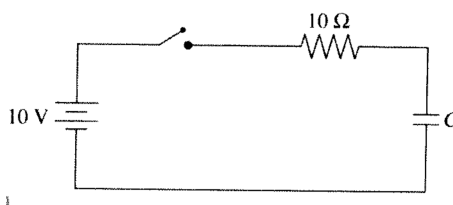
Activity 3

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.

Activity 4

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

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