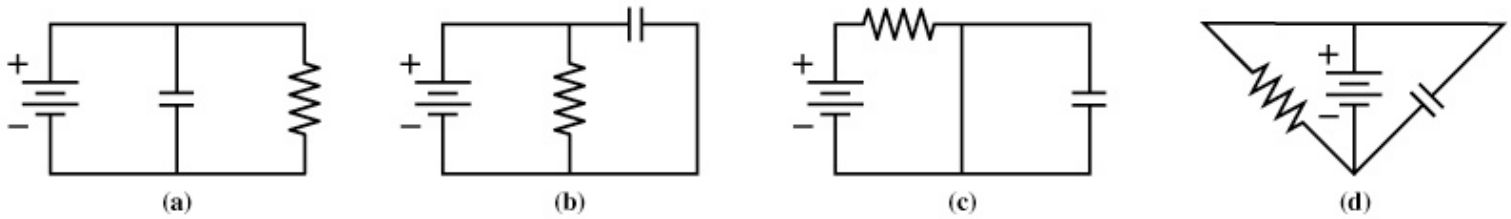
Lecture 10.2

Which of these diagrams represent the same circuit?



A. a and b
B. b and c
C. a and c
D. a, b, and d
E. a, b, and c

Review of last lecture

- Resistors in series

$$R_{\text{eq}} = R_1 + R_2 + \cdots + R_N \qquad \text{(series resistors)}$$

- Resistors in parallel

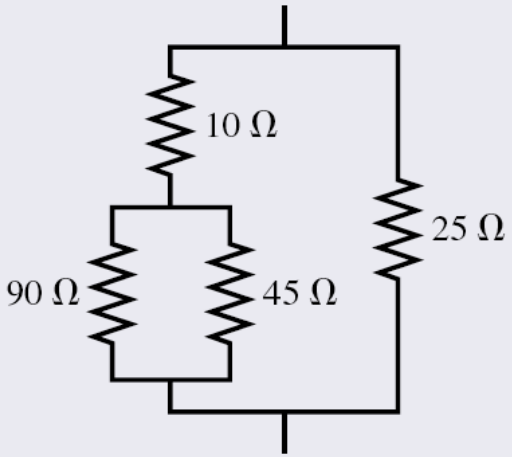
$$R_{\text{eq}} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_N}\right)^{-1} \qquad \text{(parallel resistors)}$$

EXAMPLE 32.10 A combination of resistors

EXAMPLE 32.10 A combination of resistors

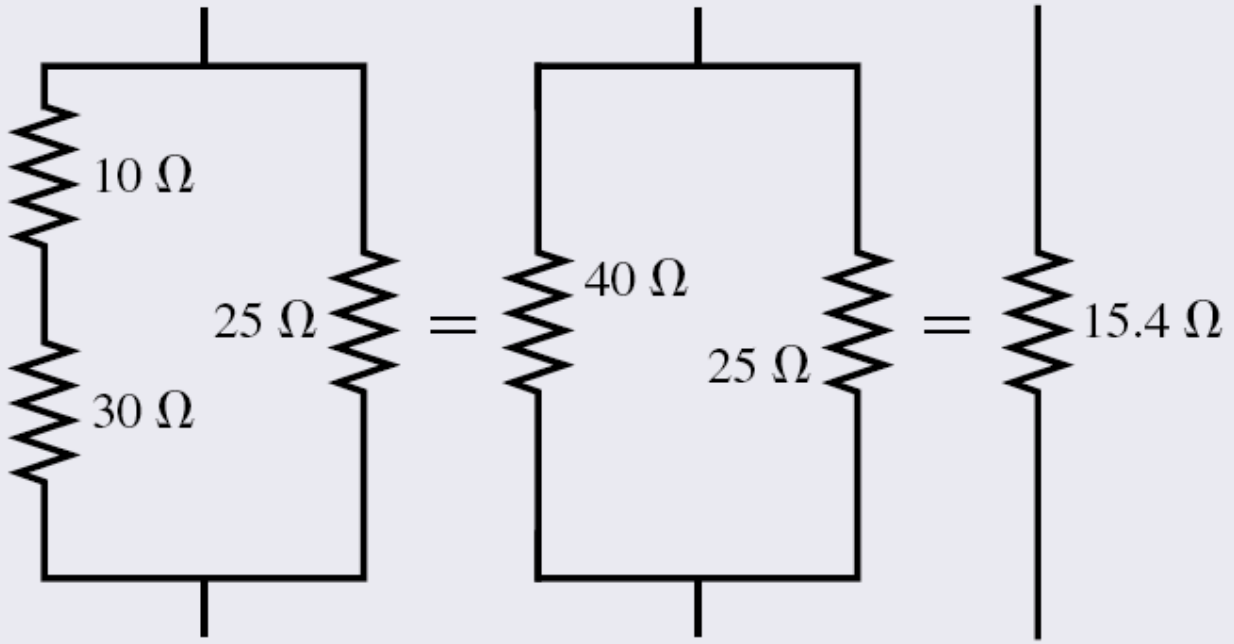
What is the equivalent resistance of the group of resistors shown in FIGURE 32.26?

FIGURE 32.26 A combination of resistors.

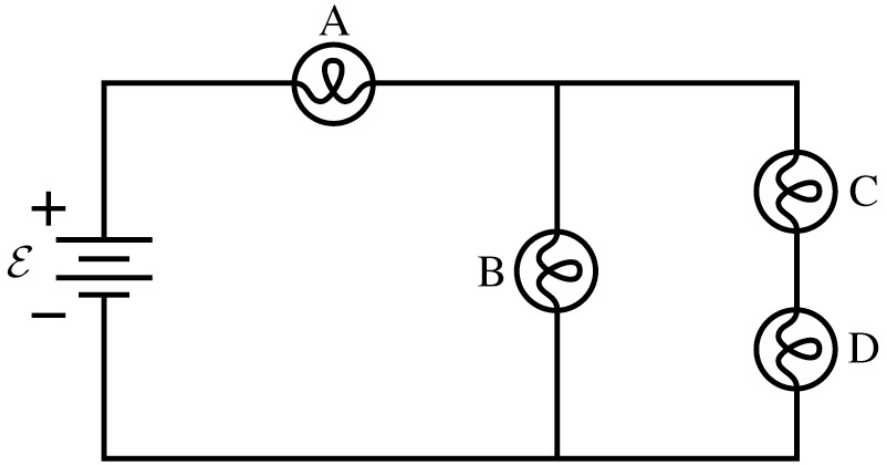


EXAMPLE 32.10 A combination of resistors

FIGURE 32.27 The combination is reduced to a single equivalent resistor.



Rank in order, from brightest to dimmest, the identical bulbs A to D.



A. C = D > B > A
B. A > C = D > B
C. A = B = C = D
D. A > B > C = D
E. A > C > B > D

How should Ammeters be Connected

- Ammeter measures the current flow **through** it.
- Ammeter must be connected in series with circuit elements whose current needs to be measured!
- Ammeter also has resistance (very small).

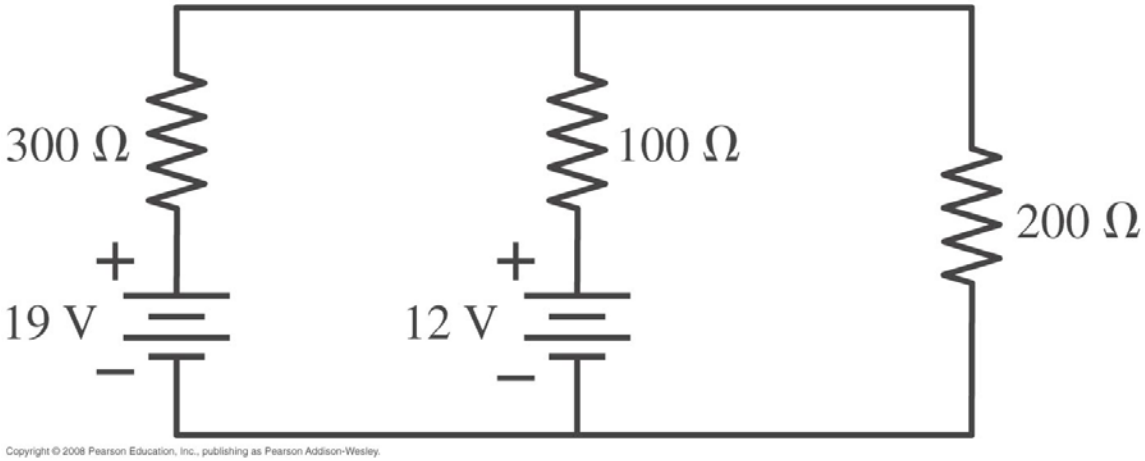
How should Voltmeter be Connected

- Voltmeter measures the potential difference between two points on the circuit where it is connected.
- Voltmeter must be connected in parallel with the circuit element whose voltage needs to be measured.
- Voltmeter has very large resistance, so that the current flowing through it can be neglected.

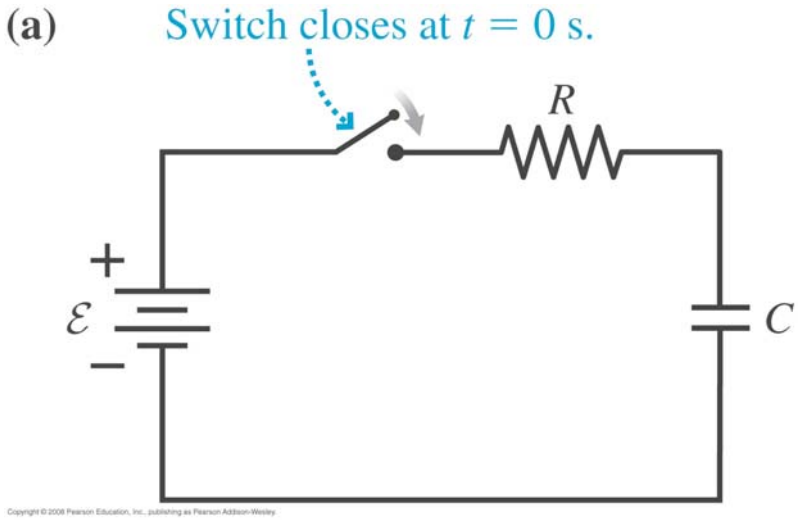
Problem-Solving Strategy: Resistor circuits

1. Assign current to each branch
2. Use Kirchhoff's Junction law to find relation between currents
3. Using Kirchhoff's loop law and Ohm's Law to set up one equations for each loop
4. Solve these equations

Example: two loop circuit, Find the current through and voltage across the 100Ohm resistor

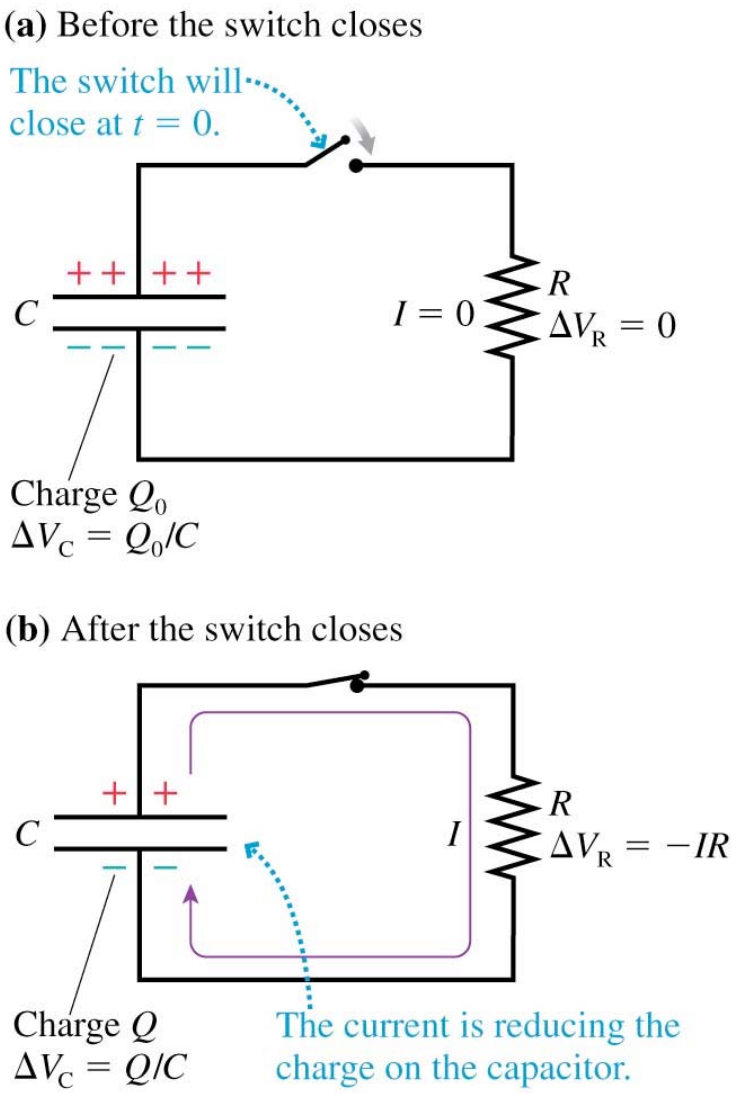


RC Circuit: Charging a Capacitor

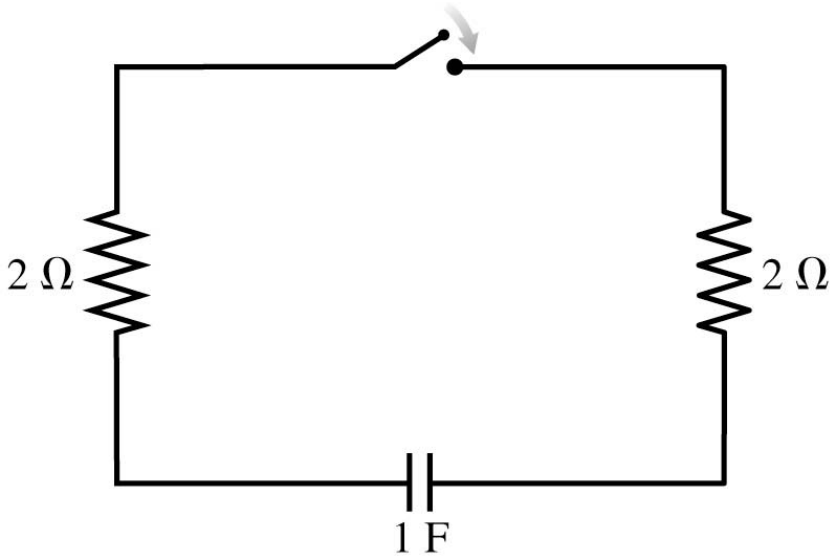


RC Circuits: Discharging a capacitor

FIGURE 32.35 An *RC* circuit.



The time constant for the discharge of this capacitor is



A. 5 s.
B. 1 s.
C. 2 s.
D. 4 s.
E. The capacitor doesn't discharge because the resistors cancel each other.