

which shows that the equivalent resistance is

$$R_{\text{eq}} = \frac{5}{6}R$$

7.10 Conceptual Questions

1. Given three resistors of resistances R_1 , R_2 and R_3 , how should they be connected to (a) maximize (b) minimize the equivalent resistance?
2. Why do the headlights on the car become dim when the car is starting?
3. Does the resistor in an RC circuit affect the maximum amount of charge that can be stored in a capacitor? Explain.
4. Can one construct a circuit such that the potential difference across the terminals of the battery is zero? Explain.

7.11 Additional Problems

7.11.1 Resistive Circuits

Consider two identical batteries of emf \mathcal{E} and internal resistance r . They may be connected in series or in parallel and are used to establish a current in resistance R as shown in Figure 7.11.1.

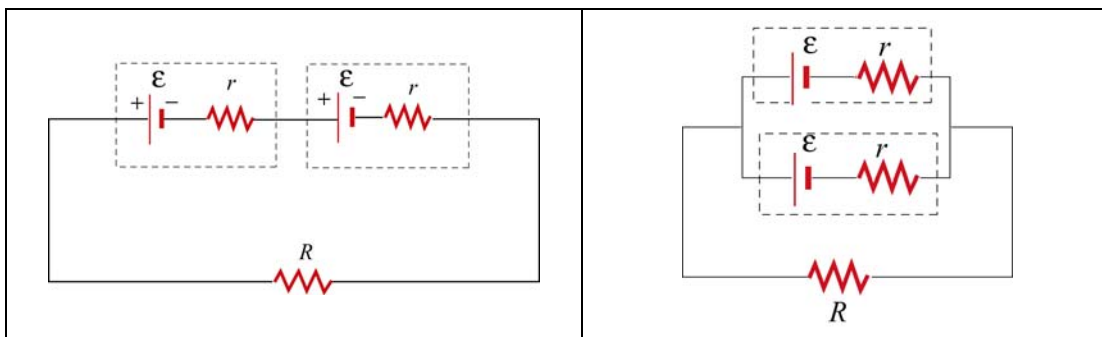


Figure 7.11.1 Two batteries connected in (a) series, and (b) parallel.

(a) Derive an expression for the current in R for the series connection shown in Figure 7.11.1(a). Be sure to indicate the current on the sketch (to establish a sign convention for the direction) and apply Kirchhoff's loop rule.

(b) Find the current for the parallel connection shown in Figure 7.11.1(b).