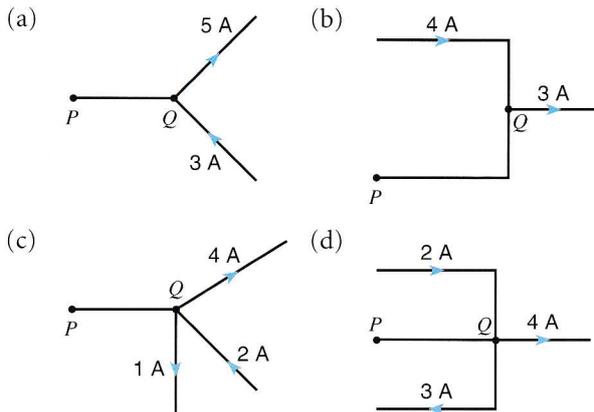


6. Calculate the missing current flowing in the wire PQ in the following cases and indicate its direction of flow.



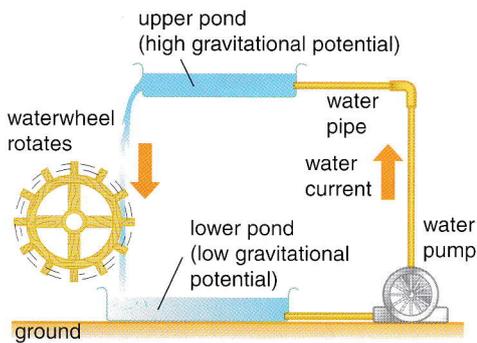
7. A spherical conductor carrying a charge of $+360 \mu\text{C}$ is insulated from the earth. When it is connected to the earth by a wire, it becomes completely discharged. The average current flowing during the discharge is 0.12 A .

- (a) With the aid of a diagram, show how the discharge takes place microscopically.
 (b) Estimate the time taken by the body to discharge itself completely.

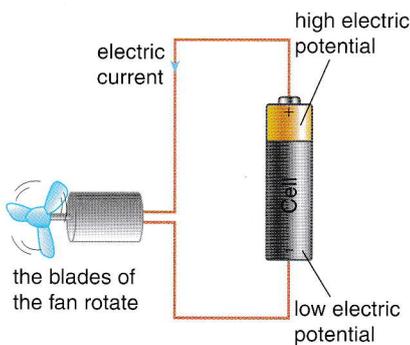
8. There are 3×10^{20} electrons passing through a given cross-section of a copper wire in 10 minutes. It is given that the magnitude of charge of an electron is $1.60 \times 10^{-19} \text{ C}$.

- (a) Find the current flowing in the wire.
 (b) If there is another thicker copper wire carrying the same size of current, what is number of electrons passing through a cross-section of the thicker wire in 10 minutes?

24.2 Energy transformations and voltages



(a) An artificial waterfall



(b) An electric circuit

Fig. 24.13 Analogy between gravitational and electrical systems

electrical energy 電能

Electricity plays an important role in everyday life. It is a vague term and sometimes it refers to **electrical energy**. It is the main source of energy which can be transformed into different forms through different loads in electric circuits. Where does the energy come from?

Energy transformations in electric circuits

Let's look back the artificial waterfall model in the Chapter opening. Figures 24.13a and 24.13b show the schematic diagrams of the waterfall model and an electric circuit respectively.

In Figure 24.13a, the pump continuously brings water from the lower pond to the upper pond. Then, the water falls to the lower pond and pushes the waterwheel. In Figure 24.13b, the blades of an electric fan rotate steadily after the fan is connected to a dry cell.

Do you notice any similarities between the two systems?