

Chapter 8. Electricity and Magnetism: Current Electricity

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Solution 1:

The flow of electrons in a particular direction in a conductor is called an electric current.

Solution 2:

An electric cell is the source of electric current in which chemical energy changes to electrical energy.

Solution 3:

The charge on an electron is -1.6×10^{-19} C.

Solution 4:

The constituents of cell are two electrodes in the form of conducting rods immersed in the solution called electrolyte.

Solution 5:

- S. I unit of electric current is Ampere
- S.I unit of potential difference is volt.
- S.I unit of resistance is ohm.

Solution 6:

$$I = 1\text{A}$$

$$T = 1\text{s.}$$

$$I = Q/t = ne/t$$

$$\text{So, } n = I.t/e = 1.1/(1.6 \times 10^{-19}) = 6.25 \times 10^{18} \text{ electrons.}$$

Solution 7:

$$I = Q/t = 0.7 / 7 = 0.1 \text{ Ampere.}$$

Solution 8:

Rheostat is used to control the current in the circuit.

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Solution 9:

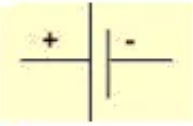
Rheostat is the variable name of electrical resistance.

Solution 10:

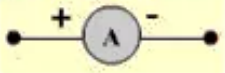
Switch is used to put the current on and off in the circuit.

Solution 11:

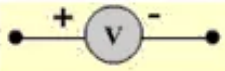
(i) Cell - Cell provide an electric current in the circuit.



(ii) Ammeter - It is a device to measure an electric current in the circuit.



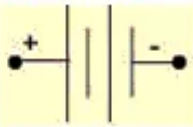
(iii) Voltmeter - It is used to measure the potential difference between two points in the circuit.



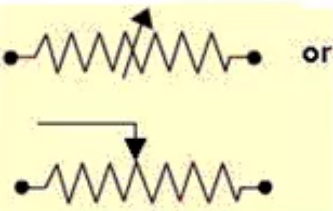
(iv) Key - It is used to put the current on and off in the circuit.



(v) Battery - It is used to charge the cell.



(vi) Rheostat - it is used to control the electric current in the circuit.



Solution 12:

$$I = Q/t \text{ So, } Q = I.t = 1.2 \times 3.0 = 3.6 \text{ C.}$$

Solution 13:

A - is a voltmeter to measure the potential difference, B is an electric resistance to control the current in the circuit, C is the ammeter to measure the magnitude of an electric current, D is cell to provide electric current in circuit, E is an electric key to on and off the circuit, F is the rheostat to control the current in circuit.

Solution 14:

The slope of the graph represents that with current flowing through a conductor is directly proportional to the potential difference applied the resistance of conductor is constant.

Solution 15:

Potential difference between two conductors is defined as the amount of work done in moving the unit positive charge from one conductor to another through the wire.

Solution 16:

Yes, electric current is a scalar quantity.

Solution 17:

The electric resistance of the wire depends on the following factors :

- The length of the wire.
- The area of cross-section of the wire.
- The temperature of the wire.
- The material of the wire.

Solution 18:

The S.I unit of resistance is ohm.

Solution 19:

If another bulb is connected in series then the resistance of the wire will increase.
If another bulb is connected in parallel then resistance will decrease.

Solution 20:

$V = IR.$

Solution 21:

The resistance of the wire is 2 ohms if a current of 1 ampere flows through it when the potential difference across it is 2 volt.

Solution 22:

The current $I = V/R = 14/28 = 0.5$ Ampere.

Solution 23:

The factors on which resistance of the wire depends are:

- The length of the wire , resistance is directly proportional to the length of wire.
- The cross-section of the wire , resistance is inversely proportional to the cross-section of the wire.
- The temperature of the wire , resistance of wire is directly proportional to the temperature of the wire.
- The material of the wire (good conductors possess less resistance.)

Solution 24:

$W = V.Q = 6.3 = 18$ Joule.

Solution 25:

The resistance of the conductor is the property due to which it opposes the flow of current in it.

Solution 26:

The potential difference between two points is 1 volt if the work done in transferring 1 coulomb of charge from one point to another point is 1 joule.