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Question 1. What does an electric circuit mean?
Answer:
An electric circuit consists of electric devices, switching devices, source of electricity, etc. that are connected by conducting wires.

Question 2. Define the unit of current.
Answer:
The unit of electric current is ampere (A). 1 A is defined as the flow of 1 C of charge through a wire in 1 s.

Question 3. Calculate the number of electrons constituting one coulomb of charge.
Answer:
One electron possesses a charge of 1.6×10^{-19} C, i.e., 1.6×10^{-19} C of charge is contained in 1 electron.

$\therefore$ 1 C of charge is contained in $\frac{1}{1.6 \times 10^{-19}} = 6.25 \times 10^{18} = 6 \times 10^{18}$ electrons

Therefore, 6×10^{18} electrons constitute one coulomb of charge.

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Question 1. Name a device that helps to maintain a potential difference across a conductor.
Answer:
A source of electricity such as cell. battery, power supply, etc. helps to maintain a potential difference across a conductor.

Question 2. What is meant by saying that the potential difference between two points is 1 V?
Answer:
If 1 J of work is required to move a charge of amount 1 C from one point to another, then it ¡S said that the potential difference between the two points is 1 V.

Question 3. How much energy is given to each coulomb of charge passing through a 6 V battery?
Answer:
The energy given to each coulomb of charge is equal to the amount of work required to move it. The amount of work ¡s given by the expression.

$$\text{Potential difference} = \frac{\text{Work done}}{\text{Charge}}$$

Work Done = Potential Difference × Charge
Where,
Charge = 1 C
Potential difference = 6 V
Work Done = 6 × 1 = 6J
Therefore, 6 J of energy ¡s given to each coulomb of charge passing through a battery of 6 V.

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Question 1. On what factors does the resistance of a conductor depend?
Answer:
The resistance of a conductor depends upon the following factors:
(a) Length of the conductor
(b) Cross-sectional area of the conductor
(c) Material of the conductor
(d) Temperature of the conductor

Question 2. Will current flow more easily through a thick wire or a thin wire of the same material, when connected to the same source? Why?
Answer:

Resistance of a wire, $R = \rho \frac{l}{A}$

Where,

ρ = Resistivity of the material of the wire

l = Length of the wire

A = Area of cross-section of the wire

Resistance is inversely proportional to the area of cross-section of the wire.
Thicker the wire, lower is the resistance of the wire and vice-versa.
Therefore, current can flow more easily through a thick wire than a thin wire.

Question 3. Let the resistance of an electrical component remains constant while the potential difference across the two ends of the component decreases to half of its former Value. What change will occur in the current through it?
Answer:
The change in the current flowing through the component is given by Ohm's law as,
V = IR

$$I = \frac{V}{R}$$

Where,
Resistance of the electrical component = R
Potential difference = V
Current = I
The potential difference is reduced by half, keeping resistance constant.
Let the new resistance be R' and the new amount of current be I'.
Therefore, from Ohm's law, we obtain the amount of new current.

$$I' = \frac{V'}{R'} = \frac{\frac{V}{2}}{R} = \frac{1}{2}\left(\frac{V}{R}\right) = \frac{I}{2}$$

Therefore, the amount of current flowing through the electrical component is reduced by half.

Question 4. Why are coils of electric toasters and electric irons made of an alloy rather than a pure metal?
Answer:
The resistivity of an alloy is higher than the pure metal Moreover, at high temperatures. the alloys do not melt readily. Hence, the coils of heating appliances such as electric toasters and electric irons are made of an alloy rather than a pure metal.

Question 5:
Use the data in Table below to answer the following —
Table shows Electrical resistivity of some substances at 20°C

–	Material	Resistivity (Ω m)
Conductors	Silver	1.60×10^{-8}
	Copper	1.62×10^{-8}
	Aluminium	2.63×10^{-8}
	Tungsten	5.20×10^{-8}
	Nickel	6.84×10^{-8}
	Iron	10.0×10^{-8}
	Chromium	12.9×10^{-8}
	Mercury	94.0×10^{-8}
	Manganese	1.84×10^{-6}
	Constantan (alloy of Cu and Ni)	49×10^{-6}
Alloys	Manganin (alloy of Cu, Mn and Ni)	44×10^{-6}
	Nichrome (alloy of Ni, Cr, Mn and Fe)	100×10^{-6}
	Glass	$10^{10} - 10^{14}$
Insulators	Hard rubber	$10^{13} - 10^{16}$
	Ebonite	$10^{15} - 10^{17}$
	Diamond	$10^{12} - 10^{13}$
	Paper (dry)	10^{12}

(a) Which among iron and mercury is a better conductor?
(b) Which material is the best conductor?
Answer:
(a) Resistivity of iron = 10.0×10^{-8} ohm m
Resistivity of mercury = 94.0×10^{-8} ohm m
Resistivity of mercury is more than that of iron. This implies that iron ¡s a better conductor than mercury.
(b) It can be observed from Table 12.2 that the resistivity of silver is the lowest among the listed materials. Hence. it is the best conductor.

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