

V. Conceptual Questions:

1. A bird sitting on a high power electric line is still safe. How?

Ans: i) Birds can sit on power lines and not get electric shocks because the electricity is always looking for a way to get to the ground, hence making the birds be safe.

ii) Current flows in a loop which means the circuit is closed. A bird sitting on a transmission line does not complete the circuit. If the same bird keeps one leg on one line and another leg or any part of its body on another line or the neutral points, then the circuit becomes closed hence causing it to get electric shock.

2. Does a solar cell always maintain the potential across its terminals constant? Discuss?

Ans: Solar cell delivers a constant current for any given illumination level, while the voltage is determined by the load resistance. Potential in a solar cell depends on the intensity of the solar radiation. Since the intensity of solar radiation is not always constant, the potential across its terminal is also not constant.

3. Can electroplating be possible with Alternating Current?

Ans: i) The heating effect and the chemical effect experiments have to be performed only with a DC cell of around 9V. The 9V DC cell will not give any electrical shock.

ii) At any cost we should not use the main domestic electric supply which is 220V AC voltage. If it is used it will give a heavy electric shock leading to a severe damage to our body.

VI. Answer the following:

1. On what factors does the electrostatic force between two charges depend?

Ans: The numerical value (magnitude) of electric force between two charges depend on the following.

- i) value of charges on them
- ii) distance between them and
- iii) Nature of medium between them

6. Name any two appliances which work under the principle of heating effect of current

Ans: Electric heating appliances like Iron box, water heater, toaster etc.,

7. How are the home appliances connected in general, in series or in parallel? Give reasons.

Ans: In a household electric circuit, different home appliances are connected in parallel to one another due to the following reasons:

- i) The appliances can be operated independently. If one appliance is switched off, others remain unaffected.
- ii) Each appliance gets the same constant voltage.
- iii) In parallel connection of electrical appliances, the overall resistance of the circuit is reduced due to which the current from the power supply is high.

8. List the safety features while handling electricity.

Ans: i) Ground connection:

The metal bodies of all the electrical appliances are to be connected to the ground by means of a third wire apart from the two wires used for electrical connection.

ii) Trip Switch:

It is an electromechanical device which does not allow a current beyond a particular value by automatically switching off the connection.

iii) Fuse:

A fuse is another safety mechanism which works on Joule heating principle.

VII. Exercises:

1. Rubbing a comb on hair makes the comb get -0.4C

a) Find which material has lost electron and which one gained it.

b) Find how many electrons are transferred in this process.

Ans: a) Comb gained electrons. Dry hair lost electron

b) No. of electrons transferred = -0.4C

1 Coulomb = 6.25×10^{18} electron

- 0.4C = $0.4 \times 6.25 \times 10^{18}$ electron

= -2.5×10^{18} electron

2. Calculate the amount of charge that would flow in 2 hours

through an element of an electric bulb drawing a current 2.5A?

Ans: Current $I = 2.5A$

time $t = 2$ hours = $2 \times 3600s$

$t = 7200s$

Amount of charge $Q = I \times t$

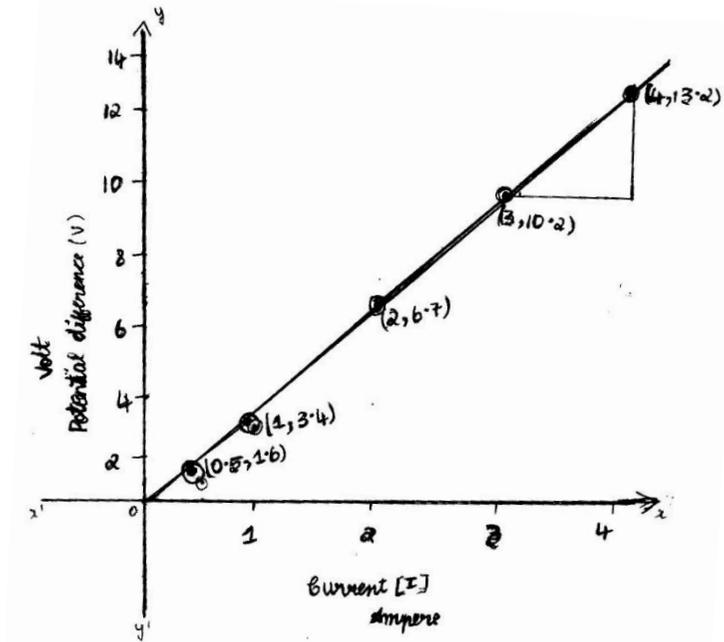
= 2.5×7200

$Q = 18,000C$

3. The value of current (I) flowing through a resistor for various potential differences V across the resistor are given below.

What is the value of Resistor?

I (Ampere)	0.5	1.0	2.0	3.0	4.0
V (Volt)	1.6	3.4	6.7	10.2	13.2



$$\begin{aligned} \text{Resistance of Resistor } R &= \frac{V_2 - V_1}{I_2 - I_1} \\ &= \frac{13.2 - 10.2}{4 - 3} \\ &= \frac{3}{1} \end{aligned}$$

$$\therefore R = 3\Omega$$