

## Short Answer Type Questions – I

[2 marks]

**Q. 1. Why does resistance of a metallic conductor increase with increase in temperature?**

**Ans.** When a metallic conductor is heated, the atoms in the metal vibrate with greater amplitude and frequency. Due to increase in temperature, the thermal velocities of free electrons also increases. Therefore, the number of collisions between free electrons and atoms increases. This increases the opposition to the movement of electrons and hence the resistance of the conductor.

**Q. 2. Why is it not advisable to handle high voltage electrical circuit with wet hands?**

**Ans.** The resistance of dry-skin human body is about  $50,000\ \Omega$ . When the skin is wet, the resistance gets lowered to about  $10,000\ \Omega$ . If a person with wet hands touches the electrical circuit, high current will flow through the body causing risk to life.

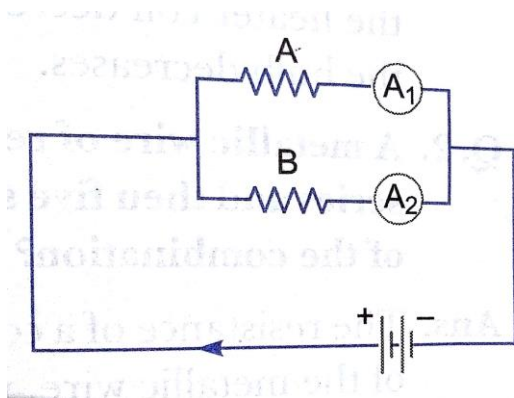
**Q. 3. Though the same current flows through line wires or the filament of a bulb, yet only the latter glows. Why?**

**Ans.** The filament of electric lamp has high resistance whereas the line wires are of negligible resistance. Since amount of heat generated is proportional to the resistance, the filament generates much more heat and it starts glowing.

**Q. 4. Heat is generated continuously in an electric heater but the temperature of its element becomes constant after some time. Why?**

**Ans.** When the temperature of the heater becomes greater than the temperature of the surrounding, some of the heat is lost to the surroundings in the form of thermal radiations. After some time, rate at which heat is being produced becomes equal to the rate of which heat is lost. Hence, the temperature of the element becomes constant.

**Q. 5. In the given circuit diagram, two resistance wires A and B are of same area of cross-section and same material, but A is longer than B. Which ammeter  $A_1$  or  $A_2$  will indicate higher reading for current? Give reason.**



**Ans.** Ammeter  $A_2$  shows higher reading. Since wire  $A_1$  is longer, it has greater resistance and so draws lesser current. So more current flows through B and  $A_2$  shows higher reading.

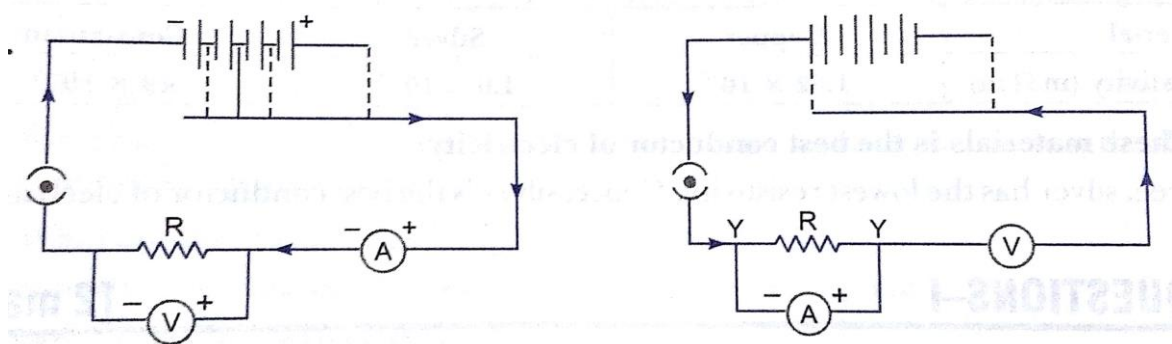
**Q. 6.** Two wires of equal length, one of copper and the other of manganin (an alloy) have the same thickness. Which one can be used for (i) electrical transmission lines (ii) electrical heating devices? Why?

**Ans. (i)** Copper wire can be used for electrical transmission lines because copper has very low resistivity and hence it is very good conductor of electricity.

**(ii)** Manganin can be used for electrical heating devices because the resistivity of manganin is about 25 times more than that of copper and hence it produces a lot of heat on passage of current through it.

**Q. 7.** A student has drawn the electric circuit to study Ohm's law as shown in figure. His teacher told that the circuit diagram needs correction. Study the circuit diagram and redraw it after making all corrections.

**Ans.**



**Q 8.** What is electrical resistivity? In a series electrical circuit comprising of a resistor having a metallic wire, the ammeter reads 5 A. The reading of the ammeter decreases to half when the length of the wire is doubled. Why?

**Ans.** The resistivity of a material is defined as the resistance of a conductor made of that material of that material of unit length and unit cross-sectional area.

Using,  $R = \rho \frac{l}{A}$

Also,  $V = RI$

R is doubled while V remains unchanged. Hence, current becomes half.