

**DELHI PUBLIC SCHOOL JAMMU**

**MONTH: MAY**

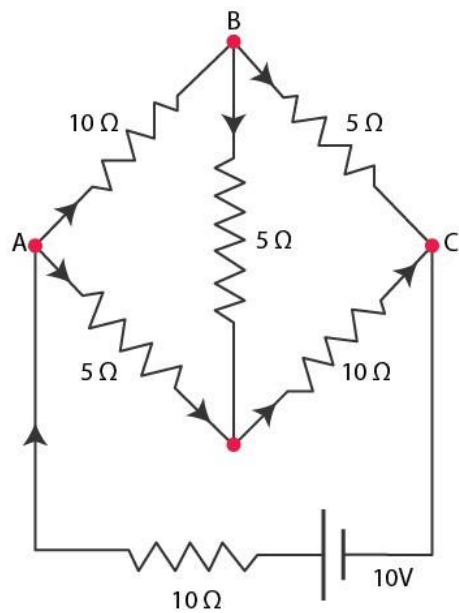
**Assignment III**

**Class XII**

**Sub: PHYSICS**

**Topic: Electricity**

- Q1 How does the conductivity of a semi-conductor change with temperature?
- Q2 A 25W and a 100 W bulb are joined in series and connected to mains. Which bulb will glow brighter? When the same two bulbs are joined in parallel, which will glow brighter?
- Q3 A 50V battery is connected across a  $10\ \Omega$  resistor. The current is 4.5A. Calculate the internal resistance of the battery.
- Q4 A battery with an emf of 10 V and an internal resistance  $3\ \Omega$  is connected to a resistor. Calculate the resistance of the resistor if the current flowing in the circuit is 0.5A. Also, calculate the voltage of the battery when the circuit is closed.
- Q5. Derive an expression for resistivity of a wire in terms of its material parameters – number density of free electrons and collision time
- Q6 Establish the relation between drift velocity of electrons in a conductor of cross-section A, carrying current I and concentration of the electrons per unit volume of the conductor being n.
- Q7 A copper conductor has a number density of free electrons estimated as  $8.5 \times 10^{28}\ \text{m}^{-3}$ . How long does an electron take to drift from one end of a wire 3.0 m long to its other end? The area of the cross-section of the wire is  $2.0 \times 10^{-6}\ \text{m}^2$  and it is carrying a current of 3.0 A.
- Q8 Two cells of emf 3V and 4V and internal resistances  $1\ \Omega$  and  $2\ \Omega$  respectively are connected in parallel so as to send current in the same direction through an external resistance of  $5\ \Omega$ . Calculate the current in each branch of the network.
- Q9. Resistance of a heating element is observed to be  $100\ \Omega$  at a room temperature of  $(27^\circ\text{C})$ . Calculate the resistance of this element if the resistance is  $117\ \Omega$ , given that the temperature coefficient of the material used for the element is  $1.70 \times 10^{-4}\ \text{C}^{-1}$
- Q10. Calculate the current in each branch of the network shown in the figure shown below :



Note:

1. Students must write assignment on assignment sheets and mention their name, class/section and date in their assignments and are to submit it in person at school to the respective subject teachers.
2. Your assignment will be marked for internal/term assessments. Therefore you are required to submit it on time.