

B.B.S SMRITIVIDYAPEETH, AURAIYA

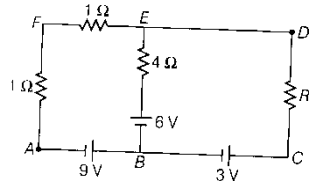
(An English Medium Co-Educational Sr. Sec.(10+2) affiliated to CBSE New Delhi)

WEEKLY ASSIGNMENT SERIES

Sub-Physics

Class- XII

Ques.1- Using kirchhoff's rules, determine the value of unknown resistance R in the circuit, so that no current flows through 4Ω resistance. Also find the potential difference between points A and D.



Ques.2- Derive an expression for drift velocity of electrons in a conductor. Hence, deduce ohm's Law.

Ques.3- A conductor of length l is connected to DC source of potential V. If the length of the conductor is tripled by gradually stretching it, keeping V constant, how will

- Drifts speed of electrons and
- Resistance of the conductor be affected? Justify your answer.

Ques.4- Two electric bulbs P and Q have their resistances in the ratio of 1:2 they are connected in series across a battery. Find the ratio of the power dissipation in these bulbs .

Ques.5- Use Kirchoff's rules to obtain balance condition of wheatstone bridge.

Ques.6- Define the term 'conductivity' of a metallic wire. Write its SI unit

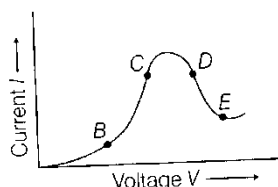
Ques.7- Using the concept of free electrons in a conductor, derive the expression for the conductivity of a wire in terms of number density and relaxation time. hence, obtain the relation between current density and the applied electric field E.

Ques.8- A cell of emf E and internal resistance r is connected across a variable load resistor R. Draw the plots of the terminal voltage V versus (i) resistance R and (ii) Current I.

it is found that when $R= 4\Omega$, the current is 1 A and when R is increase to 9Ω , the current reduces to 0.5A. Find the values of the emf E and internal resistance r.

Ques.9- Nichrome and copper wire of same length and same radius are connected in series. current I is passed through them. which wire gets heated up more? justify your answer.

Ques.10- Graph showing variation of current versus voltage for a material GaAs is shown in the the figure. Identify the region of.



Ques.11- Define the term drift velocity of charge carriers in a conductor and write its relationship with the current flowing through it.

Ques.12- Show variation of resistivity of copper as a function of temperature in graph.

Ques.13- Plot a graph showing variation of current versus voltage for the material GaAs.

Ques.14- Ten identical cells, each of emf E , having negligible internal resistance are connected in parallel with each other across an external resistance R . What is the current through this resistance?

Ques.15- The emf of a cell is always greater than its terminal voltage. Why?

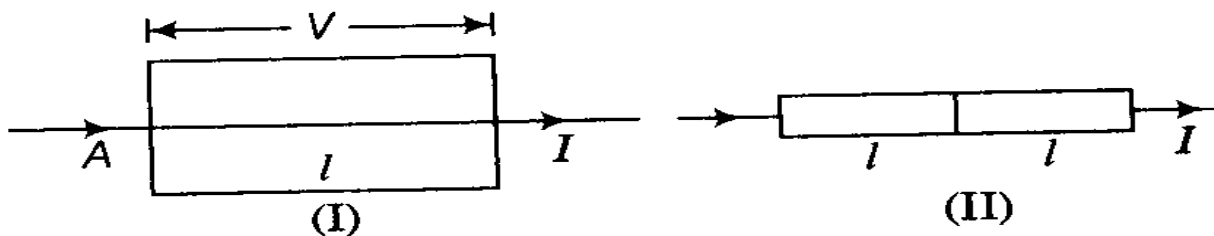
Ques.16- Describe briefly with the help of a circuit diagram, how a potentiometer is used to determine the internal resistance of a cell.

Ques.17- A heating element is marked 210V, 630W, What is the value of the current drawn by the element, when connected to a 210 V DC source?

Ques.18- When electrons drift in a metal from lower to higher potential, does it mean that all the free electrons of the metal are moving in the same direction?

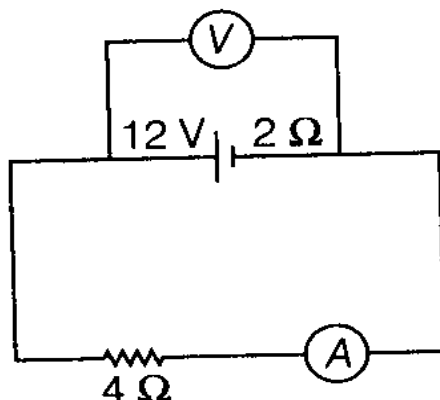
Ques.19- Show on a graph, the variation of resistivity with temperature for a typical semiconductor

Ques.20- A metal rod of square cross-sectional area A having length l has current I flowing through it when a potential difference of v volt is applied across its ends (Fig. I) Now, the rod is cut parallel to its length into two identical pieces and joined as shown in Fig. II What potential difference must be maintained across the length of $2l$, so that the current in the rod is still I ?



Ques.21- A battery of emf 12V and internal resistance $2\ \Omega$ is connected to a $4\ \Omega$ resistor as shown in the figure.

- (i) show that a voltmeter when placed across the cell and across the resistor, in turn, gives the same reading.

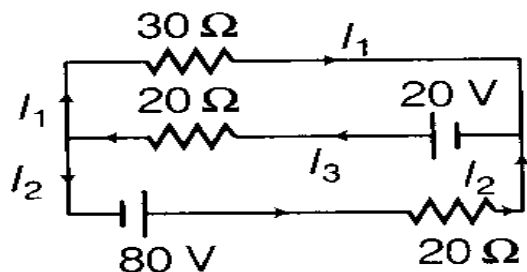


- (ii) To record the voltage and the current in the circuit, why is voltmeter placed in parallel and ammeter in series in the circuit?

Ques.22- Use krichoff's rules to determine the value of the current I_1 flowing in the circuit shown in the figure.

Ques.23- At 20°C , the carbon resistor in an electric circuit connected to a 5V battery has a resistance of 200Ω .

What is the current in the circuit when the temperature of the carbon rises to 80°C ?



Ques.24- A semiconductor has electron concentration $0.45 \times 10^{12} \text{ m}^{-3}$ and hole concentration $5 \times 10^{20} \text{ m}^{-3}$. Find its conductivity. Given electorn mobility= $0.135 \text{ m}^2/\text{Vs}$ and hole mobility = $0.048 \text{ m}^2/\text{Vs}$ and hole mobility = $0.048 \frac{\text{m}^2}{\text{Vs}}$, $e = 1.6 \times 10^{-19} \text{ C}$.

Ques.25- The emf of a battery is 2V and its internal resistance is 2Ω . its potential difference is measured by a voltmeter of resistance 998Ω calculate the percentage error in the reading of emf shown by the voltmeter