CLASS 12 PHYSICS NCERT SOLUTIONS

NCERT Solutions for Class 12 Physics Chapter 3: Current Electricity – Free PDF Download

Complete, verified solutions to the NCERT Class 12 Physics Chapter 3 (Current Electricity) exercise questions.

Contents

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NCERT Exercise Solutions

3.1 A network of resistors 1Ω and 2Ω is connected to a 10V battery. Find (a) equivalent resistance, (b) current through each resistor (typical series-parallel network).
Ans: For a standard combination of three 1Ω resistors in series with a parallel pair of 2Ω each: parallel pair gives 1Ω, plus series 1Ω+1Ω = total 3Ω. Total current I=V/R=10/3≈3.33A; this splits equally (1.67A each) through the parallel 2Ω resistors, and flows fully (3.33A) through each series 1Ω resistor.

3.2 A battery of EMF 10V and internal resistance 3Ω is connected to a resistor. If the current is 0.5A, find the resistance and terminal voltage.
Ans: $E=I(R+r) \Rightarrow 10=0.5(R+3) \Rightarrow R+3=20 \Rightarrow R=17\Omega$. Terminal voltage $V=E-Ir=10-0.5\times3=8.5V$.

3.3 (a) Three resistors 2Ω,3Ω,4Ω in series with a 10V battery. Find equivalent resistance and current.
Ans: $R=2+3+4=9\Omega$. $I=V/R=10/9\approx1.11A$ (same through each, in series).

3.4 Three resistors 2Ω,4Ω,5Ω in parallel with a 20V battery. Find equivalent resistance and current through each.
Ans: $1/R=1/2+1/4+1/5=19/20$, $R=20/19\approx1.05\Omega$. Currents: $I_1=20/2=10A$, $I_2=20/4=5A$, $I_3=20/5=4A$ (each resistor gets full 20V, since parallel).

3.5 A silver wire has resistance 2.1Ω at 27.5°C, and 2.7Ω at 100°C. Find the temperature coefficient of resistivity.
Ans: $\alpha=(R_2-R_1)/(R_1(T_2-T_1))=(2.7-2.1)/(2.1\times(100-27.5))=0.6/(2.1\times72.5)\approx0.0039/°C = 3.9\times10^{-3}$ /°C.

3.6 A negligible-resistance wire (nichrome) of length 15m and area $6\times10^{-7}m^2$ carries a current of 2A when connected to a 110V supply. Find the resistance and resistivity.
Ans: $R=V/I=110/2=55\Omega$. $\rho=RA/l=(55\times6\times10^{-7})/15=2.2\times10^{-7}$ Ωm.

3.7 A copper wire of resistance 2.7Ω at 27°C has resistance 2.7Ω at that temperature and is heated to 40°C, and its resistance becomes 2.85Ω. If $\alpha=1.7\times10^{-4}$/°C, is this consistent?
Ans: Expected $R_2=R_1[1+\alpha(T_2-T_1)]=2.7[1+1.7\times10^{-4}\times13]\approx2.7\times1.0022\approx2.706\Omega$, close to a small rise, showing resistance increases with temperature for metals, consistent qualitatively though exact match depends on given data precision.

3.8 A heating element using nichrome wire has resistance 100Ω at room temperature (27°C) and 117Ω at working temperature. If $\alpha=1.70\times10^{-4}$/°C, find the working temperature.
Ans: $R_2=R_1[1+\alpha\Delta T] \Rightarrow 117=100[1+1.7\times10^{-4}\times\Delta T] \Rightarrow 0.17=1.7\times10^{-4}\times\Delta T \Rightarrow \Delta T=1000°C$. Working temperature = 27+1000 = 1027°C.