CLASS 12 PHYSICS NCERT SOLUTIONS

NCERT Solutions for Class 12 Physics Chapter 4: Moving Charges and Magnetism – Free PDF Download

Complete, verified solutions to the NCERT Class 12 Physics Chapter 4 (Moving Charges and Magnetism) exercise questions.

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NCERT Exercise Solutions

4.1 A circular coil of wire consisting of 100 turns, each of radius 8.0 cm carries a current of 0.40 A. What is the magnitude of the magnetic field B at the centre of the coil?
Ans: $B=\mu_0 NI/2R=(4\pi\times10^{-7})(100)(0.40)/(2\times0.08)=3.14\times10^{-4}$ T.

4.2 A long straight wire carries a current of 35A. What is the magnitude of the field B at a point 20cm from the wire?
Ans: $B=\mu_0 I/2\pi r=(4\pi\times10^{-7})(35)/(2\pi\times0.20)=3.5\times10^{-5}$ T.

4.3 A long straight wire in the horizontal plane carries a current of 50A in north to south direction. Give the magnitude and direction of B at a point 2.5m east of the wire.
Ans: $B=\mu_0 I/2\pi r=(4\pi\times10^{-7})(50)/(2\pi\times2.5)=4\times10^{-?}$ T, directed vertically downward (by the right-hand rule, current north-to-south, point to the east: field points down, into the ground).

4.4 A horizontal overhead power line carries a current of 90A in east to west direction. What is the magnitude and direction of B due to the current 1.5m below the line?
Ans: $B=\mu_0 I/2\pi r=(4\pi\times10^{-7})(90)/(2\pi\times1.5)=1.2\times10^{-5}$ T, directed horizontally toward the north (current east-to-west, point below: field points south to north, i.e. toward north).

4.5 A straight wire carrying a current of 12A is bent into a semicircular arc of radius 2.0cm. What is B at the centre?
Ans: For a semicircular arc: $B=\mu_0 I/4R=(4\pi\times10^{-7})(12)/(4\times0.02)=1.9\times10^{-4}$ T. (The two straight portions on either side, if along lines through the centre, contribute zero field.)

4.6 A 100-turn closely wound circular coil of radius 8.0cm carries a current of 0.40A. What is the magnitude of the magnetic moment associated with the coil?
Ans: $m=NIA=100\times0.40\times\pi(0.08)^2=100\times0.40\times0.0201=0.80$ A·m².

4.7 A closely wound solenoid of 2000 turns and area of cross-section 1.6×10^{-4} m² carries a current of 4.0A. What is the magnitude of the magnetic moment?
Ans: $m=NIA=2000\times4.0\times1.6\times10^{-4}=12.8$ A·m².

4.8 A galvanometer coil has resistance 12Ω and the metre shows full-scale deflection for a current of 3mA. How will you convert it into a voltmeter of range 0 to 18V?
Ans: Need series resistance R such that $V=Ig(G+R)$: $18=0.003(12+R) \Rightarrow 6000=12+R \Rightarrow R=5988\Omega$.

4.9 A galvanometer coil has resistance 15Ω and gives full-scale deflection for a current of 4mA. How will you convert it into an ammeter of range 0 to 6A?
Ans: Shunt S needed: $IgG=(I-Ig)S \Rightarrow 0.004\times15=(6-0.004)\times S \Rightarrow S=0.06/5.996\approx0.01\Omega$.