

CLASS 12

PHYSICS

REVISION NOTES

Class 12 Physics Chapter 4 Moving Charges and Magnetism – Revision Notes

This Class 12 Physics Chapter 4 recap starts with the Lorentz force on a moving charge, then works through the Biot-Savart law, Ampere's circuital law, and the field patterns produced by a straight wire, loop, and solenoid.

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This Class 12 Physics Chapter 4 recap starts with the Lorentz force on a moving charge, then works through the Biot-Savart law, Ampere's circuital law, and the field patterns produced by a straight wire, loop, and solenoid.

Common Mistakes Students Make in Moving Charges and Magnetism

Mixing up right-hand rules: confusing the rule for magnetic field due to a current-carrying wire with the rule for force on a moving charge ($F = qv \times B$).

Ignoring the sign of charge: forgetting force direction depends on whether the charge is positive or negative.

Biot-Savart law errors: misidentifying the direction or contribution of a current element in non-standard geometries (loop, solenoid).

Wrong-geometry formula: using the field formula for a straight wire where a loop or solenoid formula was actually needed.

Forces

Lorentz force: $F = qv \times B$; on wire: $F = IL \times B$.

Circular motion: $r = mv / (qB)$; $T = 2\pi m / (qB)$.

Velocity selector: $v = E/B$.

Fields & Laws

Biot-Savart: $dB = (\mu_0 / 4\pi)(I \, dl \times \hat{r}) / r^2$.

Straight wire: $B = \mu_0 I / 2\pi r$; solenoid: $B = \mu_0 nI$.

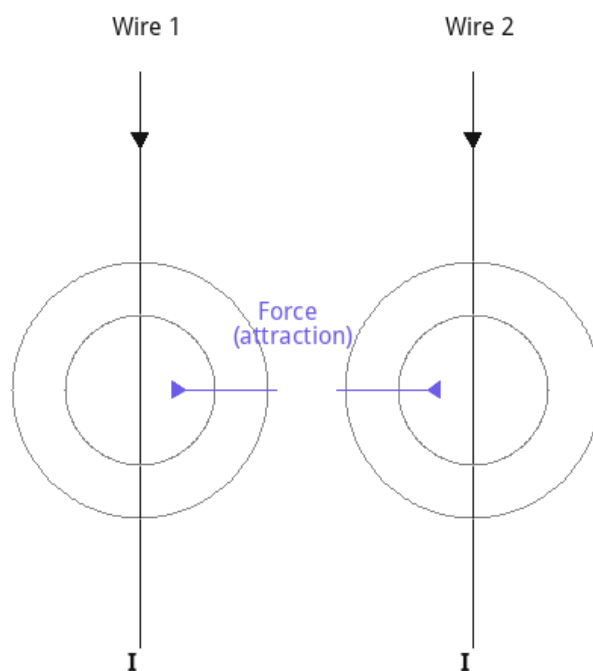
Ampere's law: $\oint B \cdot dl = \mu_0 I_{\text{enc}}$.

Parallel currents: $F/l = \mu_0 I_1 I_2 / 2\pi d$.

One-Line Summary

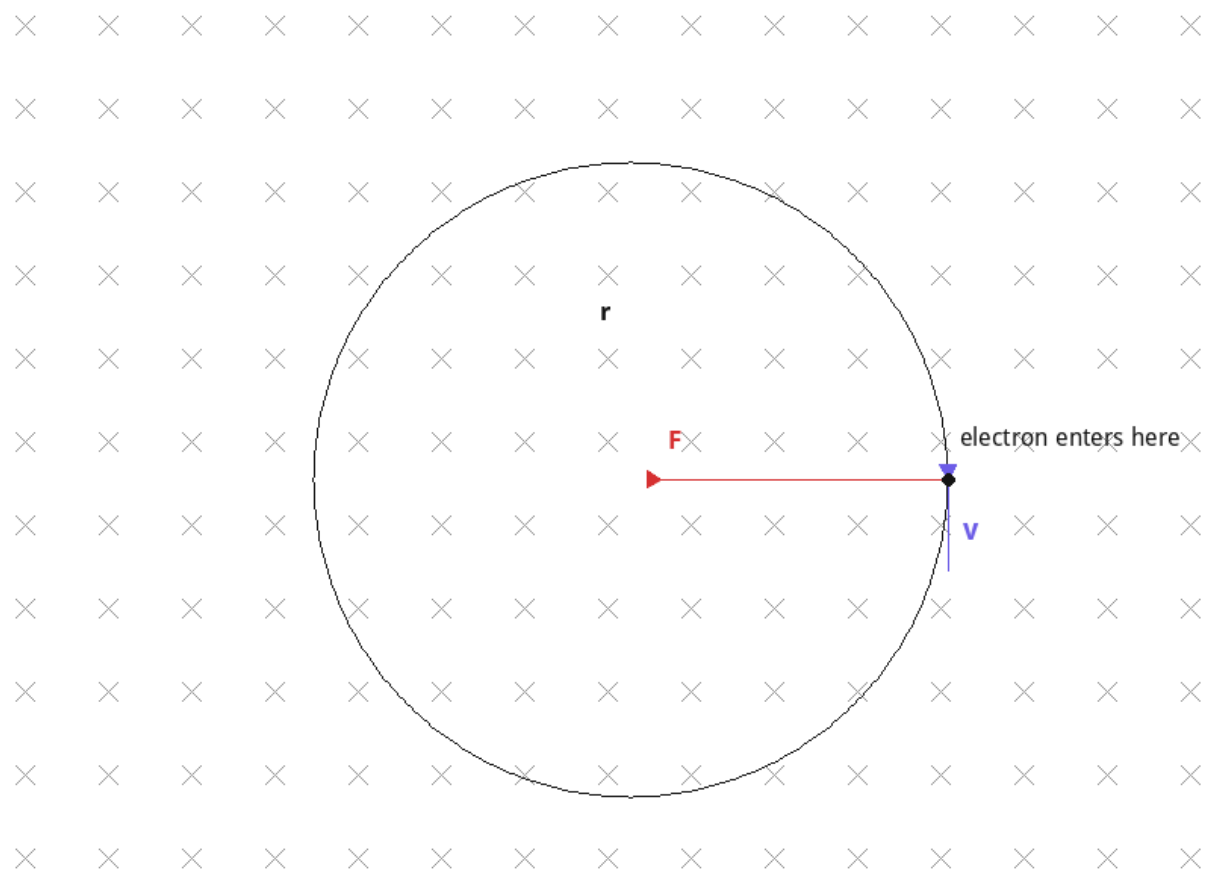
Moving charges experience magnetic (Lorentz) forces causing circular motion, while currents generate magnetic fields per Biot-Savart and Ampere's laws, enabling galvanometer-based current/voltage measurement.

Quick visual: a worked diagram from the full [Solutions](#) page, for reference.



Two parallel wires, 8.0A and 5.0A, same direction, 4.0cm apart -- attractive force.

B into the page



Electron in a uniform field (6.5G, into the page): circular path, $r = mv/(qB) = 4.2 \text{ cm}$.

Class 12 Physics Chapter 4 – Solutions and Important Questions

Need full answers or more practice? See the [Class 12 Physics Chapter 4 Solutions](#) and [Class 12 Physics Chapter 4 Extra Questions](#).

See also: [Chapter 1](#) | [Chapter 2](#) | [Chapter 3](#) | [Chapter 5](#) | [Chapter 4](#)

Practice more: [Chapter 1](#) | [Chapter 2](#) | [Chapter 3](#) | [Chapter 5](#) | [Chapter 4](#)

Quick revision: [Chapter 1](#) | [Chapter 2](#) | [Chapter 3](#) | [Chapter 5](#)

What to Revise First (and Last) in This Chapter

Prioritise the right-hand rules (for field direction and for force direction) and the standard field formulas for a straight wire, loop, and solenoid first, since these cover most questions. Leave detailed Biot-Savart law derivations for non-standard geometries for an earlier, slower revision pass.

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