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Crash Course Physics #33: Ampere's Law

Name: _____ Date: _____

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1. Ampère discovered that two wires carrying current in the same direction will _____ each other, while wires with current in opposite directions will repel each other.
2. When a current-carrying wire is coiled, it creates a magnetic field similar to a _____.
3. The rule that helps determine the direction of the magnetic field around a wire is called the _____ rule.
4. Ampère's Law can be used to calculate the strength of the magnetic field produced by a _____ wire.
5. The magnetic field created by a current in a wire forms _____ around the wire.
6. The symbol **B** is used to represent the _____ of the magnetic field.
7. In Ampère's Law, the angle between the magnetic field and the loop is represented by the Greek letter _____.
8. The magnetic constant, also known as _____, is represented by the symbol μ_0 .
9. The value of the magnetic constant is _____ Newtons per Amperes squared.
10. A _____ is a coil of wire that produces a strong, nearly uniform magnetic field inside it when current flows through it.
11. Ampère's Law states that the total magnetic field along a closed loop is equal to μ_0 times the _____ enclosed by that loop.
12. When a current loop is placed in a magnetic field, it experiences a _____ that causes it to rotate.
13. In the equation derived from Ampère's Law for a long straight wire, $B = \mu_0 I / (2\pi r)$, where r is the radius of the loop.
14. The magnetic field is strongest _____ to the wire and weakens as the distance increases.
15. Electric motors work by using magnetic _____ to turn loops of wire.

Crash Course Physics #33: Ampere's Law KEY

1. Ampère discovered that two wires carrying current in the same direction will **attract** each other, while wires with current in opposite directions will repel each other.
2. When a current-carrying wire is coiled, it creates a magnetic field similar to a **magnet**.
3. The rule that helps determine the direction of the magnetic field around a wire is called the **right-hand** rule.
4. Ampère's Law can be used to calculate the strength of the magnetic field produced by a **straight** wire.
5. The magnetic field created by a current in a wire forms **circles** around the wire.
6. The symbol **B** is used to represent the **strength** of the magnetic field.
7. In Ampère's Law, the angle between the magnetic field and the loop is represented by the Greek letter **theta**.
8. The magnetic constant, also known as **mu-zero**, is represented by the symbol μ_0 .
9. The value of the magnetic constant is **$4\pi \times 10^{-7}$** Newtons per Amperes squared.
10. A **solenoid** is a coil of wire that produces a strong, nearly uniform magnetic field inside it when current flows through it.
11. Ampère's Law states that the total magnetic field along a closed loop is equal to μ_0 times the **current** enclosed by that loop.
12. When a current loop is placed in a magnetic field, it experiences a **torque** that causes it to rotate.
13. In the equation derived from Ampère's Law for a long straight wire, $B = \mu_0 I / (2\pi r)$, where r is the radius of the loop.
14. The magnetic field is strongest **closest** to the wire and weakens as the distance increases.
15. Electric motors work by using magnetic **forces** to turn loops of wire.

15 Questions

Answer Key Included

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