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Electrostatic Parameters Formulas

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List of 14 Electrostatic Parameters Formulas

Electrostatic Parameters

1) Angular Speed of Electron in Magnetic Field

$$fx \quad \omega_e = \frac{[\text{Charge-e}] \cdot H}{[\text{Mass-e}]}$$

Open Calculator 

$$ex \quad 4E^{10} \text{rad/s} = \frac{[\text{Charge-e}] \cdot 0.23 \text{A/m}}{[\text{Mass-e}]}$$

2) Angular Speed of Particle in Magnetic Field

$$fx \quad \omega_p = \frac{q_p \cdot H}{m_p}$$

Open Calculator 

$$ex \quad 4.6 \text{rad/s} = \frac{4e-6 \text{C} \cdot 0.23 \text{A/m}}{2e-7 \text{kg}}$$

3) Diameter of Cycloid

$$fx \quad D_c = 2 \cdot R$$

Open Calculator 

$$ex \quad 8E^{-6} \text{mm} = 2 \cdot 4e-9 \text{m}$$



4) Electric Field Intensity

$$fx \quad E = \frac{F}{q}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 3.428571V/m = \frac{2.4N}{0.7C}$$

5) Electric Flux

$$fx \quad \Phi_E = E \cdot A \cdot \cos(\theta)$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 24.23962C/m = 3.428V/m \cdot 10m^2 \cdot \cos(45^\circ)$$

6) Electric Flux Density

$$fx \quad D = \frac{\Phi_E}{SA}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 1.388889C/m = \frac{25C/m}{18m^2}$$

7) Electrostatic Deflection Sensitivity

$$fx \quad S_e = \frac{L_{def} \cdot L_{crt}}{2 \cdot d \cdot V_a}$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 0.001333m/V = \frac{50m \cdot 0.012mm}{2 \cdot 2.5mm \cdot 90V}$$




8) Hall Voltage 

$$fx \quad V_h = \left(\frac{H \cdot I}{RH \cdot W} \right)$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad 0.851852V = \left(\frac{0.23A/m \cdot 2.2A}{6 \cdot 99mm} \right)$$

9) Magnetic Deflection Sensitivity 

$$fx \quad S_m = (L_{def} \cdot L_{crt}) \cdot \sqrt{\left(\frac{[Charge-e]}{2 \cdot [Mass-e] \cdot V_a} \right)}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 18.75537m/V = (50m \cdot 0.012mm) \cdot \sqrt{\left(\frac{[Charge-e]}{2 \cdot [Mass-e] \cdot 90V} \right)}$$

10) Magnetic Field Intensity 

$$fx \quad H = \frac{I}{2 \cdot \pi \cdot d_{wire}}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 0.234051A/m = \frac{50m}{2 \cdot \pi \cdot 34m}$$



11) Particle Acceleration

$$fx \quad a_p = \frac{[\text{Charge-e}] \cdot E}{[\text{Mass-e}]}$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$ex \quad 602923.5\text{m/ms}^2 = \frac{[\text{Charge-e}] \cdot 3.428\text{V/m}}{[\text{Mass-e}]}$$

12) Path Length of Particle in Cycloidal Plane

$$fx \quad R = \frac{V_{ef}}{\omega_e}$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$ex \quad 4E^{-9}\text{m} = \frac{160.869\text{m/s}}{4e10\text{rad/s}}$$

13) Radius of Electron on Circular Path

$$fx \quad r_e = \frac{[\text{Mass-e}] \cdot V_e}{H \cdot [\text{Charge-e}]}$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

$$ex \quad 0.012397\text{mm} = \frac{[\text{Mass-e}] \cdot 501509\text{m/s}}{0.23\text{A/m} \cdot [\text{Charge-e}]}$$

14) Transition Capacitance

$$fx \quad C_T = \frac{[\text{Permittivity-vacuum}] \cdot A_{jp}}{W_d}$$

[Open Calculator !\[\]\(7bc43b319a082987e20f7bf78f4bab80_img.jpg\)](#)

$$ex \quad 7.643182\text{pF} = \frac{[\text{Permittivity-vacuum}] \cdot 0.019\text{m}^2}{22\text{mm}}$$



Variables Used







- **A** Area of Surface (Square Meter)
- **A_{jp}** Junction Plate Area (Square Meter)
- **a_p** Particle Acceleration (Meter Per Square Millisecond)
- **C_T** Transition Capacitance (Picofarad)
- **d** Distance between Deflecting Plates (Millimeter)
- **D** Electric Flux Density (Coulomb per Meter)
- **D_c** Diameter of Cycloid (Millimeter)
- **d_{wire}** Distance from Wire (Meter)
- **E** Electric Field (Volt per Meter)
- **E** Electric Field Intensity (Volt per Meter)
- **F** Electric Force (Newton)
- **H** Magnetic Field Strength (Ampere per Meter)
- **I** Electric Current (Ampere)
- **l** Length of Wire (Meter)
- **L_{crt}** Cathode Ray Tube Length (Millimeter)
- **L_{def}** Length of Deflecting Plates (Meter)
- **m_p** Particle Mass (Kilogram)
- **q** Electric Charge (Coulomb)
- **q_p** Particle Charge (Coulomb)
- **R** Particle Cycloidal Path (Meter)
- **r_e** Radius of Electron (Millimeter)
- **RH** Hall Coefficient













- S_e Electrostatic Deflection Sensitivity (Meter per Volt)
- S_m Magnetic Deflection Sensitivity (Meter per Volt)
- SA Surface Area (Square Meter)
- V_a Anode Voltage (Volt)
- V_e Electron Velocity (Meter per Second)
- V_{ef} Velocity of Electron in Force Fields (Meter per Second)
- V_h Hall Voltage (Volt)
- W Width of Semiconductor (Millimeter)
- W_d Width of Depletion Region (Millimeter)
- θ Angle (Degree)
- Φ_E Electric Flux (Coulomb per Meter)
- ω_e Angular Speed of Electron (Radian per Second)
- ω_p Angular Speed of Particle (Radian per Second)



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Constant:** **[Charge-e]**, 1.60217662E-19
Charge of electron
- **Constant:** **[Mass-e]**, 9.10938356E-31
Mass of electron
- **Constant:** **[Permittivity-vacuum]**, 8.85E-12
Permittivity of vacuum
- **Function:** **cos**, cos(Angle)
Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- **Function:** **sqrt**, sqrt(Number)
A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- **Measurement:** **Length** in Millimeter (mm), Meter (m)
Length Unit Conversion 
- **Measurement:** **Weight** in Kilogram (kg)
Weight Unit Conversion 
- **Measurement:** **Electric Current** in Ampere (A)
Electric Current Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement:** **Speed** in Meter per Second (m/s)
Speed Unit Conversion 
- **Measurement:** **Acceleration** in Meter Per Square Millisecond (m/ms²)
Acceleration Unit Conversion 



- **Measurement: Electric Charge** in Coulomb (C)
Electric Charge Unit Conversion 
- **Measurement: Force** in Newton (N)
Force Unit Conversion 
- **Measurement: Angle** in Degree ($^{\circ}$)
Angle Unit Conversion 
- **Measurement: Capacitance** in Picofarad (pF)
Capacitance Unit Conversion 
- **Measurement: Magnetic Field Strength** in Ampere per Meter (A/m)
Magnetic Field Strength Unit Conversion 
- **Measurement: Linear Charge Density** in Coulomb per Meter (C/m)
Linear Charge Density Unit Conversion 
- **Measurement: Electric Field Strength** in Volt per Meter (V/m)
Electric Field Strength Unit Conversion 
- **Measurement: Electric Potential** in Volt (V)
Electric Potential Unit Conversion 
- **Measurement: Angular Velocity** in Radian per Second (rad/s)
Angular Velocity Unit Conversion 
- **Measurement: Deflection Sensitivity** in Meter per Volt (m/V)
Deflection Sensitivity Unit Conversion 



Check other formula lists

- [Charge Carrier Characteristics Formulas](#) 
- [Diode Characteristics Formulas](#) 
- [Electrostatic Parameters Formulas](#) 
- [Semiconductor Characteristics Formulas](#) 
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