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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

Open Calculator

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

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

2) Angular Speed of Particle in Magnetic Field

Open Calculator

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

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

3) Diameter of Cycloid

Open Calculator

fx $$D_c = 2 \cdot R$$

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

4) Electric Field Intensity

Open Calculator

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

ex $$600\text{V/m} = \frac{2.4\text{N}}{0.004\text{C}}$$

5) Electric Flux

Open Calculator

fx $$\Phi_E = E_I \cdot A \cdot \cos(\theta)$$

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

6) Electric Flux Density

Open Calculator

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

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

7) Electrostatic Deflection Sensitivity

Open Calculator

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

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

8) Hall Voltage

Open Calculator

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

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

9) Magnetic Deflection Sensitivity

Open Calculator

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

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

10) Magnetic Field Intensity

Open Calculator

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

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

11) Particle Acceleration

Open Calculator

$$a_p = \frac{[\text{Charge-e}] \cdot E_I}{[\text{Mass-e}]}$$

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

12) Path Length of Particle in Cycloidal Plane

Open Calculator

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

$$4\text{E^-9m} = \frac{160.869\text{m/s}}{4\text{e10rad/s}}$$

13) Radius of Electron on Circular Path

Open Calculator

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

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

14) Transition Capacitance

Open Calculator

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

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

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_l 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: **[Permitivity-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 (°)
  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**
- **Transistor Operating Parameters Formulas**

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