

25PY101: Engineering Physics for Quantum Computing

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Solution: CGS to SI Conversion Factors

Conversion factors

1. $1 \text{ cm}^3 = 10^{-6} \text{ m}^3$
2. $1 \text{ cm}^2/(\text{V}\cdot\text{s}) = 10^{-4} \text{ m}^2/\text{V}\cdot\text{s}$
3. $1 \text{ cm}^{-3} = 10^6 \text{ m}^{-3}$
4. $1 \text{ V/cm} = 10^2 \text{ V/m}$
5. $1 \text{ A/cm}^2 = 10^4 \text{ A/m}^2$
6. $1 \text{ S/cm} = 10^2 \text{ S/m}$
7. $1 \Omega \cdot \text{cm} = 10^{-2} \Omega \text{ m}$
8. $1 \mu\Omega \cdot \text{cm} = 10^{-8} \Omega \text{ m}$
9. $1 \text{ F/cm} = 10^2 \text{ F/m}$
10. $1 \text{ fs} = 10^{-15} \text{ s}$

Measured quantities

1. $15.6 \text{ cm}^3 \times 10^{-6} = 1.56 \times 10^{-5} \text{ m}^3$
2. $8500 \text{ cm}^2/\text{V}\cdot\text{s} \times 10^{-4} = 8.5 \times 10^{-1} \text{ m}^2/\text{V}\cdot\text{s}$
3. $4.8 \times 10^{16} \text{ cm}^{-3} \times 10^6 = 4.8 \times 10^{22} \text{ m}^{-3}$
4. $5 \times 10^{16} \text{ cm}^{-3} \times 10^6 = 5 \times 10^{22} \text{ m}^{-3}$
5. $30 \text{ kV/cm} \times 10^2 = 3.0 \times 10^6 \text{ V/m}$
6. $25 \text{ A/cm}^2 \times 10^4 = 2.5 \times 10^5 \text{ A/m}^2$
7. $3.5 \times 10^{-3} \text{ S/cm} \times 10^2 = 3.5 \times 10^{-1} \text{ S/m}$
8. $1.68 \times 10^{-6} \Omega \cdot \text{cm} \times 10^{-2} = 1.68 \times 10^{-8} \Omega \cdot \text{m}$
9. $8.55 \mu\Omega \cdot \text{cm} \times 10^{-8} = 8.55 \times 10^{-8} \Omega \cdot \text{m}$
10. $2.1 \times 10^{-11} \text{ F/cm} \times 10^2 = 2.1 \times 10^{-9} \text{ F/m}$