

# BASIC ELECTRIC FORMULAS

## ELECTRIC FORCE AND FIELD

$$F_e = k \frac{|q_1| |q_2|}{R^2}$$

$$\vec{F}_e = q \vec{E}$$

$$\vec{E} = k \frac{|q|}{R^2}$$

$$\Phi_e = EA \cos \theta$$

$$\epsilon_0 = \frac{1}{4\pi k}$$

## ELECTRICAL POTENTIAL

$$V = kQ$$

$$PE_e = k \frac{q_1 q_2}{R}$$

$$W_e = q \Delta V$$

$$E = \frac{\Delta V}{d}$$

## CAPACITANCE

$$C = \frac{Q}{\Delta V}, Q = -C \Delta V, \Delta V = \frac{Q}{C}$$

$$U = \frac{1}{2} Q \Delta V, U = \frac{1}{2} C V^2,$$

$$U = \frac{Q^2}{2C}$$

$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \dots$$

$$C_p = C_1 + C_2 + C_3 \dots$$

$$C = k \epsilon_0 A / d$$

## FARADAY'S LAW

$$\Phi_m = BA \cos \theta$$

$$\mathcal{E}_{ind} = -N \frac{\Delta \Phi_m}{\Delta t}$$

$$\mathcal{E}_{ind} = -BLv$$

## TRANSFORMER

$$\frac{\Delta V_{in}}{\Delta V_{out}} = \frac{N_p}{N_s}$$

## INDUCTANCE

$$\mathcal{E} = -L \frac{\Delta I}{\Delta t}, L = \frac{N \Phi_m}{I}$$

$$U = \frac{1}{2} LI^2$$

## RESISTANCE AND CURRENT

$$\Delta V = IR, I = \frac{\Delta V}{R}$$

$$R = \frac{\Delta V}{I}, P = I \Delta V,$$

$$P = I^2 R, P = \frac{\Delta V^2}{R}$$

$$R_s = R_1 + R_2 + R_3 \dots$$

$$R_p = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots$$

$$\sum_{\text{loop}} \Delta V_i = 0, J = \frac{I}{A}$$

$$\mathcal{E} = \Delta V + Ir$$

$$= I(R + r)$$

$$J = \sigma E, R = \frac{\rho L}{A}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = 2\pi f_0$$

## MAGNETIC FIELD & FORCE

$$F_m = |q| v B \sin \theta$$

$$F_m = I L B \sin \theta$$

$$\tau_{net} = IAB \sin \theta$$

$$B = \frac{\mu_0 I}{2\pi r}, B = \frac{\mu_0 I}{2a}$$

$$B = \frac{\mu_0 N I}{L} = \mu_0 n I$$

## AC CIRCUITS

$$Z = \sqrt{R^2 + (X_L - X_C)^2} \quad \Delta V_{rms} = \frac{\Delta V_m}{\sqrt{2}}$$

$$\phi = \tan^{-1} \left( \frac{X_L - X_C}{R} \right) \quad I_{rms} = \frac{I_m}{\sqrt{2}}$$

# Basic Electrical Formulas

**Rachel S Tattersall**



## Basic Electrical Formulas:

BASIC ELECTRIC CIRCUITS Dr. T.S.N.G Sarada Devi, Dr. Sridhar Gaddam, Mr. Vadlamudi Naresh, Mr. Nimmakanti Anil, 2025-09-28 Basic Electric Circuits is designed as a foundational textbook for students educators and professionals seeking a clear and comprehensive understanding of electric circuit principles Electric circuits form the backbone of all modern electrical and electronic systems and a strong conceptual base in this area is essential for anyone pursuing studies in electrical engineering electronics instrumentation or related domains This book has been developed to serve as an accessible yet rigorous resource that bridges fundamental theory with practical application The content of this book is organized in a structured and progressive manner Beginning with basic electrical quantities and laws it gradually advances toward complex network theorems transient analysis AC circuits resonance polyphase systems and practical circuit design aspects Each chapter includes detailed explanations illustrative diagrams and solved examples aimed at enhancing clarity of understanding The problems provided at the end of each chapter encourage learners to apply the concepts develop analytical skills and gain confidence in problem solving This book emphasizes both conceptual clarity and real world relevance Wherever possible practical insights engineering interpretations and application oriented discussions have been included These features make the text equally useful for classroom teaching self study exam preparation and laboratory support The authors acknowledge the contributions of educators researchers and industry practitioners whose ideas methods and advancements have shaped the field of electric circuits over the decades Special appreciation is extended to students whose enthusiasm and curiosity continue to inspire the creation of effective learning materials It is our sincere hope that this book becomes a valuable learning companion and a reliable reference for all readers We invite feedback and suggestions to continuously improve future editions

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of basic electricity in a way that is clear to the point and very easy to understand. It forms an excellent foundation for those who wish to proceed from the basics to more advanced topics. Numerous illustrations are included to simplify learning both theories and their applications. Direct current and alternating current devices and circuits are explained in detail. Magnetism as well as motors and generators are described to give the reader a thorough understanding of them. The book is an excellent resource for the layperson as well as licensed electricians. *Basic Electricity* United States. Department of the Army, 1977

*Basic Electrical Formulae* Andrew Butler, 2006. A simple to use quick reference guide to basic electrical formulae containing worked examples of how to find Reactance Impedance Resistance Voltage Reactance Apparent True Power Horse Power and Current in ac dc circuits for both single and three phase wiring systems. How the properties of triangles can be used when making calculations. Also includes a brief guide to Power Factor Volt Drop and sizing of cables. **Basic**

**Electricity** United States. Bureau of Naval Personnel, 1960. *Basic Electricity* U.S. Bureau of Naval Personnel, 2012-05-09. Originally a training course, best nontechnical coverage. Topics include batteries, circuits, conductors, AC and DC inductance and capacitance, generators, motors, transformers, amplifiers, etc. Many questions with answers, 349 illustrations, 1969 edition.

*Basic Electrical Principles* Maurice Grayle Suffern, 1949. **Design of Electric Systems for Naval Aircraft and Missiles** United States. Bureau of Naval Weapons, 1964. *Mike Holt's Illustrated Guide to Electrical Formulas with Sample Calculations* Charles Michael Holt, Mike Holt Enterprises, Incorporated, 2005-01-01. Technical Manual: Design of Electric Systems for Naval Aircraft and Missiles United States. Naval Air Systems Command, **Navy Electricity and Electronics**

**Training Series** Jack L. Formy Duval, 1992. **The Navy Electricity and Electronics Training Series: Module 19 The Technician's Handbook** United States. Navy, 2018-09-16. Module 19 The Technician's Handbook is a handy reference of commonly used general information such as electrical and electronic formulas, color coding, and naval supply system data. The Navy Electricity and Electronics Training Series NEETS was developed for use by personnel in many electrical and electronic related Navy ratings. Written by and with the advice of senior technicians in these ratings, this series provides beginners with fundamental electrical and electronic concepts through self study. The presentation of this series is not oriented to any specific rating structure but is divided into modules containing related information organized into traditional paths of instruction. "Code of Massachusetts regulations, 2006", 2006 Archival snapshot of entire looseleaf Code of Massachusetts

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## **Table of Contents Basic Electrical Formulas**

1. Understanding the eBook Basic Electrical Formulas
  - The Rise of Digital Reading Basic Electrical Formulas
  - Advantages of eBooks Over Traditional Books
2. Identifying Basic Electrical Formulas
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Basic Electrical Formulas
  - User-Friendly Interface
4. Exploring eBook Recommendations from Basic Electrical Formulas
  - Personalized Recommendations
  - Basic Electrical Formulas User Reviews and Ratings
  - Basic Electrical Formulas and Bestseller Lists
5. Accessing Basic Electrical Formulas Free and Paid eBooks
  - Basic Electrical Formulas Public Domain eBooks
  - Basic Electrical Formulas eBook Subscription Services
  - Basic Electrical Formulas Budget-Friendly Options
6. Navigating Basic Electrical Formulas eBook Formats

- ePub, PDF, MOBI, and More
- Basic Electrical Formulas Compatibility with Devices
- Basic Electrical Formulas Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Basic Electrical Formulas
  - Highlighting and Note-Taking Basic Electrical Formulas
  - Interactive Elements Basic Electrical Formulas
- 8. Staying Engaged with Basic Electrical Formulas
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Basic Electrical Formulas
- 9. Balancing eBooks and Physical Books Basic Electrical Formulas
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Basic Electrical Formulas
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Basic Electrical Formulas
  - Setting Reading Goals Basic Electrical Formulas
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Basic Electrical Formulas
  - Fact-Checking eBook Content of Basic Electrical Formulas
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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