

Basic Electrical Engineering Formulas And Equations

Electrical Formulas

These are the Basic Electrical Formulas Related to Ohm's Law.

Variables used in these formulas are as follows:

V = Voltage in Volts

I = Current in Amperes

R= Resistance in Ohms

Power = In Watts

Voltage Formulas

$$V=IR, \quad V=PI, \quad V=\sqrt{P \times R}$$

Current Formulas

$$I = V/R, \quad I=P/V, \quad I=\sqrt{P/R}$$

Resistance Formulas

$$R=V/I, \quad R=P/I^2, \quad R=P/V^2$$

Power Formulas

$$P=VI, \quad P=I^2R, \quad P=V^2/R$$

Following are several additional formulas, which are useful for calculating Current, Horsepower, KW, and kVA for both Single Phase & Three Phase AC Current.

HP= Horsepower

EFE = EfficiencyFactor (Use 0.9 when not mentioned)

PF=Power Factor (Use 0.8 when not mentioned)

AC = Alternating Current

To Find:	Single-Phase	Three Phase
Current, when Motor Hp is known	$\frac{HP \times 746}{V \times EFE \times PF}$	$\frac{HP \times 746}{V \times EFE \times PF \times 1.73}$
Ampers, when kW is known	$\frac{kW \times 1000}{V \times PF}$	$\frac{kW \times 1000}{V \times PF \times 1.73}$
Current, when kVA is Known	$\frac{kVA \times 1000}{V \times 1.73}$	$\frac{kVA \times 1000}{V \times 1.73}$
kilowatts (kW)	$\frac{V \times I \times PF}{1000}$	$\frac{V \times I \times PF \times 1.73}{1000}$
kW input, when Motor HP is Known	$\frac{HP \times 0.746}{EFE}$	$\frac{HP \times 0.746}{EFE}$
kilovolt-Amperes (kVA)	$\frac{V \times I}{1000}$	$\frac{V \times I \times 1.73}{1000}$
Horsepower (HP)	$\frac{V \times I \times EFE \times PF}{746}$	$\frac{V \times I \times EFE \times PF \times 1.73}{746}$

Useful Electrical Formulas

To Obtain	Single Phase	Three Phase
kilowatts	$\frac{V \times L \times PF}{1000}$	$\frac{1.732 \times V \times L \times PF}{1000}$
kV-A	$\frac{V \times L}{1000}$	$\frac{1.732 \times V \times L}{1000}$
Horsepower required when generator kW unknown (if generator efficiency is unknown, use 0.93)	$\frac{kW}{0.746 \times \text{Efficiency (Generator)}}$	$\frac{kW}{0.746 \times \text{Efficiency (Generator)}}$
kW input when motor hp known (if motor efficiency is unknown, use 0.85 x hp)	$\frac{HP \times 0.746}{\text{Efficiency (Motor)}}$	$\frac{HP \times 0.746}{\text{Efficiency (Motor)}}$
Ampers when motor hp is known	$\frac{HP \times 0.746}{V \times PF \times \text{Efficiency}}$	$\frac{HP \times 0.746}{1.732 \times V \times PF \times \text{Efficiency}}$
Ampers when kW is known	$\frac{kW \times 1000}{V \times PF}$	$\frac{kW \times 1000}{1.732 \times V \times PF}$
Ampers when kW-A is known	$\frac{kV-A \times 1000}{V}$	$\frac{kV-A \times 1000}{1.732 \times V}$

All Basic Electrical Engineering Formulas

Dr. K. A. Navas, T. A. Suhail



All Basic Electrical Engineering Formulas:

BASIC ELECTRICAL ENGINEERING SURYAMANI MISHRA, Electrical engineering plays a significant role in our everyday lives affecting numerous technologies and systems Key Areas of Electrical Engineering 1 Power Systems This area deals with the generation transmission and distribution of electricity Engineers in this field work on ensuring reliable power supply and the integration of renewable energy sources like solar and wind 2 Electronics This involves the study and design of electronic circuits and devices which can include everything from semiconductors to integrated circuits It has applications in consumer electronics telecommunications and more 3 Control Systems This area focuses on designing systems that maintain desired outputs despite changes in external conditions Applications range from industrial automation to robotics and aerospace 4 Telecommunications This subfield involves the transmission of information over distances for communication purposes It encompasses everything from mobile phone networks to satellite communication 5 Signal Processing This involves analysing and manipulating signals predominantly electrical signals to improve transmission and reception quality It is essential in audio video and data communications 6 Instrumentation This area focuses on the design of devices and systems that measure physical quantities like temperature pressure or flow and convert these measurements into signals for monitoring and control

Basic Electrical Engineering Mehta V.K. & Mehta Rohit, 2008 For close to 30 years Basic Electrical Engineering has been the go to text for students of Electrical Engineering Emphasis on concepts and clear mathematical derivations simple language coupled with systematic development of the subject aided by illustrations makes this text a fundamental read on the subject Divided into 17 chapters the book covers all the major topics such as DC Circuits Units of Work Power and Energy Magnetic Circuits fundamentals of AC Circuits and Electrical Instruments and Electrical Measurements in a straightforward manner for students to understand

A Textbook of Electrical Technology - Volume I (Basic Electrical Engineering) BL Theraja, 2005 The primary objective of vol I of A Text Book of Electrical Technology is to provide a comprehensive treatment of topics in Basic Electrical Engineering both for electrical as well as nonelectrical students pursuing their studies in civil mechanical mining textile chemical industrial environmental aerospace electronic and computer engineering both at the Degree and diploma level Based on the suggestions received from our esteemed readers both from India and abroad the scope of the book has been enlarged according to their requirements Almost half the solved examples have been deleted and replaced by latest examination papers set upto 1994 in different engineering colleges and technical institutions in India and abroad

The Electrical Engineering Handbook Wai Kai Chen, 2004-11-16 The Electrical Engineer's Handbook is an invaluable reference source for all practicing electrical engineers and students Encompassing 79 chapters this book is intended to enlighten and refresh knowledge of the practicing engineer or to help educate engineering students This text will most likely be the engineer's first choice in looking for a solution extensive complete references to other sources are provided throughout No other book has the breadth and depth of coverage

available here This is a must have for all practitioners and students The Electrical Engineer s Handbook provides the most up to date information in Circuits and Networks Electric Power Systems Electronics Computer Aided Design and Optimization VLSI Systems Signal Processing Digital Systems and Computer Engineering Digital Communication and Communication Networks Electromagnetics and Control and Systems About the Editor in Chief Wai Kai Chen is Professor and Head Emeritus of the Department of Electrical Engineering and Computer Science at the University of Illinois at Chicago He has extensive experience in education and industry and is very active professionally in the fields of circuits and systems He was Editor in Chief of the IEEE Transactions on Circuits and Systems Series I and II President of the IEEE Circuits and Systems Society and is the Founding Editor and Editor in Chief of the Journal of Circuits Systems and Computers He is the recipient of the Golden Jubilee Medal the Education Award and the Meritorious Service Award from the IEEE Circuits and Systems Society and the Third Millennium Medal from the IEEE Professor Chen is a fellow of the IEEE and the American Association for the Advancement of Science 77 chapters encompass the entire field of electrical engineering THOUSANDS of valuable figures tables formulas and definitions Extensive bibliographic references

Basic Electrical Engineering: Principles, Designs and Applications Vibhav Kumar Sachan, Syed Akhtar Imam, 2024-11-18 Basic Electrical Engineering Principles Designs and Applications has been widely utilized in recent years in electrical engineering microprocessors electrical drives and power electronics research among other fields This book aims to cater to the needs of the undergraduate courses in the discipline of Electronics Communication Engineering Electronics Instrumentation Engineering Electrical Electronics Engineering Instrumentation and Control Engineering and postgraduate students specializing in Electronics Control Engineering It will also serve as reference material for engineers employed in industry The fundamental concepts and principles behind transformers three phase circuits and electrical generators and motors are explained in a simple easy to understand manner Each chapter contains a good number of short answers and of multiple choice questions with explanation which makes the book quite useful for Indian Engineering Service IES Graduate Aptitude Test in Engineering GATE National Eligibility Test NET State Eligibility Test SET University Grants Commission Council of Scientific Industrial Research UGC CSIR and other entrance examinations

Basic Electrical Engineering R. K. Rajput, 2009-02 *BASIC ELECTRICAL ENGINEERING* Dr. K. A. Navas, T. A. Suhail, 2018-08-01 This book is prepared as per the syllabus of Dr A P J Abdul Kalam Technical University Uttar Pradesh for first year B Tech Engineering course using the reference books given in the course syllabus Authors have tried to elucidate the topics such a way that even a mediocre student can assimilate them Many solved problems sample question papers and exercise given in every section will provide a thorough understanding of topics

Basic Electrical Engineering K. N. Srinivas, 2013-12-30 The aim of this book is to provide a consolidated text for the first year B E Computer Science and Engineering students and B Tech Information Technology students of Anna University The syllabus has been thoroughly revised for the non semester yearly pattern by the University The book made up of five chapters systematically

covers the five units of the syllabus It begins with a detailed discussion on the fundamentals of electric circuits DC circuits AC circuits 3 phase circuits resonance and the network theorems Lecture type presentation of the rudiments of the fundamentals in conjunction with hundreds of solved examples is the strength of this book Magnetic circuits and various magnetic elements and their properties with number of illustrations are presented DC machines and transformers are further dealt with Equivalent circuits of machines supported with the respective photographs will ease the reader to understand the concepts of machines much better Synchronous machines and asynchronous machines and fundamentals of control systems with various practical examples and relevant worked illustrations conclude this book A large number of numerical illustrations and diagrammatic representations make this book valuable for students and teachers

Basic Electrical Engineering SINGH, S. N., 2010-10-30 This book presents comprehensive coverage of all the basic concepts in electrical engineering It is designed for undergraduate students of almost all branches of engineering for an introductory course in essentials of electrical engineering This book explains in detail the properties of different electric circuit elements such as resistors inductors and capacitors The fundamental concepts of dc circuit laws such as Kirchhoff's current and voltage laws and various network theorems such as Thevenin's theorem Norton's theorem superposition theorem maximum power transfer theorem reciprocity theorem and Millman's theorem are thoroughly discussed The book also presents the analysis of ac circuits and discusses transient analysis due to switch operations in ac and dc circuits as well as analysis of three phase circuits It describes series and parallel RLC circuits magnetic circuits and the working principle of different kinds of transformers In addition the book explains the principle of energy conversion the operating characteristics of dc machines three phase induction machines and synchronous machines as well as single phase motors Finally the book includes a discussion on technologies of electric power generation along with the different types of energy sources Key Features Includes numerous solved examples and illustrations for sound conceptual understanding Provides well graded chapter end problems to develop the problem solving capability of the students Supplemented with three appendices addressing matrix algebra trigonometric identities and Laplace transforms of commonly used functions to help students understand the mathematical concepts required for the study of electrical engineering

Basic Electrical Engineering Semester-II (RTM) Nagpur University B L Theraja, Kiran Manish Kimmatkar, Umesh E. Hiwase & A K Theraja, Basic Electrical Engineering is written exclusively for B Tech Second semester students of various branches as per the revised syllabus of Rashtrasant Tukadoji Maharaj Nagpur University Nagpur RTMNU Nagpur Each of the important topics that help the student in learning the principles of Electrical Engineering more effectively have been included

All Basic Electrical Engineering Formulas Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become much more apparent than ever. Its power to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**All Basic Electrical Engineering Formulas**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we will delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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