

What does the Basic Electronics Test cover?

DC Circuit Analysis: *Knowledge and Skill Requirements*

- Use Ohm's law to solve for E, I or R
- Understand the relationship of conductor size and length to resistance
- Use the power formula to solve for P, E or I
- Understand the relationships of efficiency, power input and power output in a circuit
- Calculate the total resistance of a series resistance circuit
- Calculate the total resistance of a parallel resistance circuit
- Simplify series-parallel resistance networks in order to determine the E, I, R or P across any network component using Kirchhoff's Law

AC Circuit Analysis: *Knowledge and Skill Requirements*

- Understand the concept of a sine wave including phase, frequency, period and amplitude
- Understand the relationships among rms, peak, and peak-to-peak voltage in alternating current circuits and be able to solve for any of these using a formula provided
- Understand the concepts of capacitance and inductance
- Understand the relationship of capacitive and inductive reactance with frequency
- Recognize the symbols for reactance—capacitive and inductive
- Understand the E and I phase relationships in reactive (inductive or capacitive) circuits
- Understand the concepts of true power, apparent power, and power factor (PF) in a reactive circuit and be able to solve for any of these using a formula

Transmission Lines: *Knowledge and Skill Requirements*

- Understand the concept of impedance matching and the effects of mismatch on the transfer of energy
- Understand how the primary constants (resistance, capacitance and inductance) of a transmission line affect the attenuation of a signal
- Understand the decibel concept and how it applies to signal transmission
- Convert from a power or voltage ratio to decibels and vice versa
- Convert from an absolute power or voltage value to decibels and vice versa
- Calculate attenuation over a transmission line using decibels (dB)
- Understand the purpose and function of various protective devices and recognize their schematic symbols

Electronics Fundamentals: *Knowledge and Skill Requirements*

- Recognize various types of passive frequency filters and understand how they work
- Understand basic solid state theory of a diode
- Understand the concept of forward and reverse bias of a diode
- Understand the function of various diode types and their application in a circuit
- Recognize the electronic symbols for various diode types
- Understand basic transistor theory and the concept of gain in an amplifier
- Recognize the schematic symbols for various transistor types

- Understand the function of a transistor in a simple circuit
- Understand basic transistor biasing and stabilization concepts
- Understand how AC is converted to DC by rectification and filtering in a power supply
- Recognize the type of rectifier configurations—half-wave and full-wave rectification
- Understand the concept of power supply regulation and how transistors and diodes are used to perform this function
- Know how to trace signal flow in a simple circuit such as a power supply or amplifier
- Understand the basic functions of multimeters—both digital and analog
- Know how to use a multimeter to troubleshoot circuit components such as diodes, capacitors, inductors and resistors
- Know how to use a multimeter to find a short and open in a simple circuit
- Know how to use voltage multipliers (high-voltage probes) to extend a multimeter's range
- Know how to use current multipliers (current shunts) with a multimeter to extend its range
- Interpret multimeter readings when using a high-voltage probe by calculating the voltage drop across the probe (Ohm's law) based on the combined series resistance of the probe and multimeter input
- Interpret the multimeter reading when using a current shunt based on the voltage drop across the shunt and its resistance

Applied Math: Knowledge and Skill Requirements

- Add, subtract, multiply, and divide whole numbers and decimals
- Manipulate positive and negative numbers
- Manipulate powers of ten and logarithms
- Understand symbols for subunits of electrical quantities and be able to convert from one subunit to another (Examples: k = kilo = 1000, μ = micro = 10^{-6})
- Solve equations given a formula such as Ohm's law
- Understand what *direct* and *inverse* relationships are

Use of a Scientific Calculator: Knowledge and Skill Requirements

- Use the proper key stroke sequence to apply a formula
- Store and recall values in memory
- Calculate using exponents, reciprocals, powers and roots
- Determine the log and \log^{-1} (anti-log) of a given ratio or value
- Determine the sin, cos, \sin^{-1} or \cos^{-1} of a given phase relationship

The practice test and other info (including the above) is found at

<http://www.asisvcs.com/publications/pdf/710042.pdf>