

REACTANCE FORMULAS

$$C = \frac{1}{2\pi f X_C} \quad X_C = \frac{1}{2\pi f C}$$

$$L = \frac{X_L}{2\pi f} \quad X_L = 2\pi f L$$

RESONANT FREQUENCY FORMULAS

$$F = \frac{1}{2\pi\sqrt{LC}} \quad f_{kHz} = \frac{159.2}{\sqrt{LC}}$$

$$L = \frac{1}{4\pi^2 f^2 C} \quad L_{\mu HY} = \frac{25.330}{f^2 C}$$

$$C = \frac{1}{4\pi^2 f^2 L} \quad C_{\mu FD} = \frac{25.330}{f^2 L}$$

Where f is in kHz
L is in microhenries
C is in microfarads

CONVERSION FACTORS

$$\pi = 3.14 \quad 2\pi = 6.28$$

$$\pi^2 = 9.87 \quad \log \pi = 0.497$$

1 meter = 3.28 feet
1 inch = 2.54 centimeters
1 radian = 57.3°

FREQUENCY AND WAVELENGTH FORMULAS

$$f_{kHz} = \frac{3 \times 10^5}{\lambda_{METERS}} \quad \lambda_{METERS} = \frac{3 \times 10^5}{f_{kHz}}$$

$$f_{MHz} = \frac{984}{\lambda_{FEET}} \quad \lambda_{FEET} = \frac{984}{f_{MHz}}$$

0.625λ = 225° = 5/8 WAVE
0.5λ = 180° = HALF WAVE
0.311λ = 112°
0.25λ = 90° = QUARTER WAVE

RESISTORS IN SERIES

$$R_{TOTAL} = R_1 + R_2 + R_3 + \dots$$

RESISTORS IN PARALLEL

EQUAL RESISTORS

$$R_{TOTAL} = \frac{R}{n} \quad \text{Where n is the total number of resistors}$$

UNEQUAL RESISTORS

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

$$R_{TOTAL} = \frac{R_1 R_2}{R_1 + R_2} \quad R_1 = \frac{R_1 R_2}{R_2 - R_T}$$

If the current through a resistor doubles, the power dissipated quadruples

IMPEDANCE FORMULAS

SERIES CIRCUITS — R & X IN SERIES

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

PARALLEL CIRCUITS — R & X IN PARALLEL

$$Z = \frac{RX}{\sqrt{R^2 + X^2}}$$

DIRECT POWER FORMULA

$$P = I^2 R$$

Where I is the common point or base current in amperes, and R is the common point or base resistance in ohms

INDIRECT POWER FORMULA

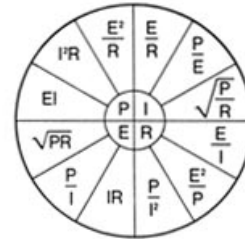
$$P = IE(\text{effy})$$

Where I is the final P.A. current in amperes, E is the final P.A. voltage in volts, and effy is the transmitter efficiency expressed in decimal form (79% = 0.79)

SINE WAVE CONVERSION

Effective Value = 0.707 × Peak Value
Average Value = 0.637 × Peak Value
Peak Value = 1.414 × Effective Value (RMS)
Effective Value = 1.11 × Average Value
Peak Value = 1.57 × Average Value
Average Value = 0.9 × Effective Value (RMS)

OHM'S LAW FORMULAS FOR DC CIRCUITS



ONE CYCLE TIME DURATION

10kHz = 100μsec
20kHz = 50μsec
100kHz = 10μsec
200kHz = 5μsec
250kHz = 4μsec
1MHz = 1μsec
4MHz = 0.25μsec
10MHz = 0.1μsec

BINARY TO BASE 10 CONVERSION

$$1 (2^3) = 8$$

$$0 (2^2) = 0$$

$$1 (2^1) = 2$$

$$1 (2^0) = + 1$$

$$\hline 11$$

DECIBEL FORMULAS

Where impedances are equal

$$dB = 10 \log \frac{P_1}{P_2} = 20 \log \frac{E_1}{E_2} = 20 \log \frac{I_1}{I_2}$$

Where impedances are unequal

$$dB = 10 \log \frac{P_1}{P_2} = 20 \log \frac{E_1 \sqrt{Z_2}}{E_2 \sqrt{Z_1}} = 20 \log \frac{I_1 \sqrt{Z_1}}{I_2 \sqrt{Z_2}}$$

0dBm (1mW) = 0.774 volts across 600 ohms
0.387 volts across 150 ohms
0.224 volts across 50 ohms

TRANSFORMER TURNS RATIOS

$$\text{Primary Power} = \text{Secondary Power}$$

$$\frac{N_p}{N_s} = \frac{E_p}{E_s} = \frac{I_s}{I_p} = \sqrt{\frac{Z_p}{Z_s}}$$