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

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

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

$0.625\lambda = 225° = {}^5/_8$ WAVE
$0.5\lambda = 180° =$ HALF WAVE
$0.311\lambda = 112°$
$0.25\lambda = 90° =$ QUARTER WAVE

RESISTORS IN SERIES

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

RESISTORS IN PARALLEL

EQUAL RESISTORS

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

UNEQUAL RESISTORS

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

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

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

$P = I^2R$

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

$P = IE(effy)$

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

$1\ (2^3) = 8$
$0\ (2^2) = 0$
$1\ (2^1) = 2$
$1\ (2^0) = 1$
$+$
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

Primary Power = Secondary Power

$\frac{N_P}{N_S} = \frac{E_P}{E_S} = \frac{I_S}{I_P} = \sqrt{\frac{Z_P}{Z_S}}$