ETA CETa Exam Common Formulas

Potential Divider
As the name says, we divide the potential or reduce the voltage in a circuit with help of potential divider.

$V_{out} = V_{in} * R_2 / (R_1 + R_2)$

Current Divider
It is used to redirect current flowing in a circuit.

$I_{out} = I_{in} * R_1 / (R_1 + R_2)$

Balanced Wheatstone Bridge
A bridge used to measure resistances.

$(R_1 / R_2) = (R_3 / R_4)$

Voltage gain in decibels
Gain dB = 20 log (Vout / Vin)

Ratio of 2 power levels in decibels
Gain dB = 20 log (Vout / Vin)

Resonant frequency
$F_R = .159 / \sqrt{LC}$

P = I * E, the power being dissipated by the resistor is a product of the current and the applied voltage.

Resistors in series
$R = R_1 + R_2 + R_3 ...$

Resistors in parallel
$1 / R = (1 / R_1) + (1 / R_2) + (1 / R_3) ...$

The resistance of a conductor at a temperature, t, is given by the equation: $R_t = R0(1 + \alpha t + b\ t2 + y\ t3)$ where **α, b, y** are constants and **R0** is the resistance at 0°C. Note that b & y are very small hence they can be neglected.

Therefore above equation simplifies to: $R_t = R_0(1 + \alpha t)$ where **α** = temperature coefficient of resistance.

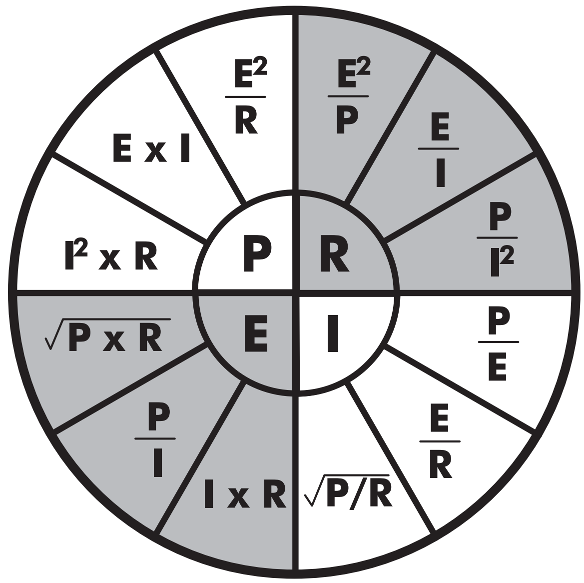
Inductors connected in series
$L = L_1 + L_2 + L_3 + ...$

Inductors connected in parallel
$1 / L = (1 / L_1) + (1 / L_2) ...$

Reactance of inductors
$X_L = 2 * \pi * f * L$

where X_L is reactance, f is frequency, and **L** is inductance

Ohm's Law



E = Voltage I = Current
P = Power R = Resistance

Current flowing in a Capacitor
The current flowing in a capacitor is proportional to the product of the capacitance, **C**, and the rate of change of applied voltage.

i = C × (rate of change of voltage[d * V / d * t])

How to Compute Charge or Quantity of Electricity
Q = C * V

where **Q** is the charge (in coulombs), **C** is the capacitance (in farads), and **V** is the potential difference (in volts).

Energy Storage in a Capacitor
$W = ½\ C * V^2$

where **W** is the energy (in Joules), **C** is the capacitance (in Farads), and **V** is the potential difference (in Volts).

Capacitors connected in parallel
$C = C_1 + C_2 + C_3 + ...$

Capacitors connected in series
$1 / C = (1 / C_1) + (1 / C_2) ...$

Reactance of capacitors
$X_C = 1 / (2 * \pi * f * C)$