

Construction/Industrial Electrician Level 1 v3  
Formulas

1.  $kVA = (V \times A) / 1000$
2.  $RPM = 120F / P$
3.  $V_S / V_P = N_S / N_P$
4.  $N_S / N_P = I_P / I_S$
5.  $P = I^2 R$
6.  $I = E/R$
7.  $P = E \times I$
8.  $PF = kW / kVA$
9. True 3 $\Phi$  Power =  $E_L \times I_L \times PF \times 1.732$
10.  $P$  (Watts) =  $hp \times 746$
11.  $E_P \times N_S = E_S \times N_P$
12.  $PF = W/VA$
13.  $V = V_L / 1.73$
14.  $VA = \sqrt{P_2 + (VAR_L - VAR_C)^2}$
15. Wye  $E_P = E_L / 1.732$
16. (Series Inductors)  $L_T = L_1 + L_2 + L_3$
17. (Parallel Inductors)  $1 / L_T = 1 / L_1 + 1/L_2 + 1 / L_3$
18. (Parallel Capacitors)  $C_T = C_1 + C_2 + C_3$
19. (Series Capacitors)  $1 / C_T = 1 / C_1 + 1/C_2 + 1 / C_3$
20.  $X_L = 2\pi f l$
21.  $X_C = 1 / 2\pi f C$
22.  $C^2 = A^2 + B^2$
23.  $Z = \sqrt{R^2 + (X_L - X_C)^2}$
24. Fault Current = Secondary current/ Impedance
25.  $1 W = 3.41 BTU / H$
26.  $N = 120F/P$
27. Power (HP) = (Torque (lb.in.) x speed)/63,025
28. Motor Efficiency % = (Power out / Power in) x 100
29.  $T_K = T_C + 273.15$
30. % Slip = (Stator speed – Rotor speed / Stator speed) x 100
31. % Voltage regulation (Transformers or Alternators) = ([Voltage no-load – Voltage full-load] / Voltage full-load) x 100
32. 3 $\Phi$  Amps =  $VA / (Volts \times 1.732)$
33. Motor Torque (N·m) =  $(W \times 9.549) / Speed$
34.  $1 ft.lb. = 1.356 N\cdot m$
35. Torque (ft.lb.) =  $(HP \times 5252) / Speed$
36. 3 $\Phi$  Apparent Power (VA) =  $E_L \times I_L \times 1.732$
37.  $T_F = T_C \times 9/5 + 32$
38.  $1 gallon = .0036047 in.^3$
39. R factor =  $RSI \times 5.68$

40.  $R = KIL / CMA$
41.  $R_T = R_1 + R_2 + R_3$  (series)
42. Effective Value = Peak Value x 0.707
43. Angle Theta =  $1 / \cos PF$
44.  $I_T = \sqrt{I_R^2 + (I_{XL} - I_{XC})^2}$  (parallel)
45.  $\tau (T) = RC$
46.  $\tau (T) = L / R$
47.  $\tau (T) = 63.2\%$
48. 1- $\Phi$  half-wave rectifier: maximum value x 0.318
49. 1-full-wave rectifier: maximum value x 0.637
50. 3-half-wave rectifier: maximum value x 0.827
51. 3-full-wave rectifier: maximum value x 0.955

