

**Construction/Industrial Electrician
Level 3
Formulas (v2)**

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 Φ 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. $Z = \sqrt{R^2 + (x_L^2 - x_C^2)}$
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 Φ 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 Φ 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 x 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 – Φ 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
52. $R_m = kV + 1$
53. $hp = \frac{(2\pi) \times torque \times rpm}{33\,000}$

