Industrial Electrician Level 4 v3
Formulas

1. kVA = (V x 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 x I
8. PF = *kw* / *k*VA
9. True 3Φ Power = E_L x I_L x PF x 1.732
10. P (Watts) = hp x 746
11. E_P x N_S = E_S x 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 = 2πfl
21. X_C = 1 / 2πfC
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. 3Φ Amps = VA / (Volts x 1.732)
33. Motor Torque (N·m) = (W x 9.549) / Speed
34. 1 ft.lb. = 1.356 N·m
35. Torque (ft.lb.) = (HP x 5252) / Speed
36. 3Φ Apparent Power (VA) = E_L x I_L x 1.732
37. T_F = T_C x 9/5 + 32
38. 1 gallon = .0036047 $in.^3$
39. R factor = RSI x 5.68

40. R = KL/CM
41. $R_T = R_1 + R_2 + R_3$ (series)
42. Effective Value = Peak Value x 0.707
43. Angle Theta = $\cos^{-1}$ 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 = <u>(2Π) x torque x rpm</u>*
33 000