

EE 320 Exam 2

Equation Sheet

Fall 2011

For a 'wye' system: $V_L = (\sqrt{3}\angle 30^\circ)V_\phi$

For a 'delta' system: $I_L = (\sqrt{3}\angle -30^\circ)I_\phi$

$$Z_\Delta = 3Z_Y$$

For a three-phase system: $S_T = \sqrt{3}V_L I_L$

For power factor correction: $C = \frac{Q}{\omega V^2}$

For Magnetic Circuits:

$$\begin{aligned} \Phi &= BA & B &= \mu_o \mu_r H & \mu_o &= \frac{4\pi \times 10^{-7} \text{H}}{\text{m}} & mmf &= NI = \Phi \mathfrak{R} \\ L &= \frac{N^2}{\mathfrak{R}} & \mathfrak{R} &= \frac{l_{path}}{\mu_o \mu_r A_{path}} \end{aligned}$$

For Synchronous Machines:

$$E_a = \frac{L_{SF} I_F \omega_e}{\sqrt{2}} \angle \delta \quad P_{total} = \frac{3V_s E_a}{X_s} \sin(\delta) \quad T_{dev} = \frac{P_{total}}{\omega_m}$$