LIGADO EM ESTRELA

$V_{LINHA} = 220\,V$

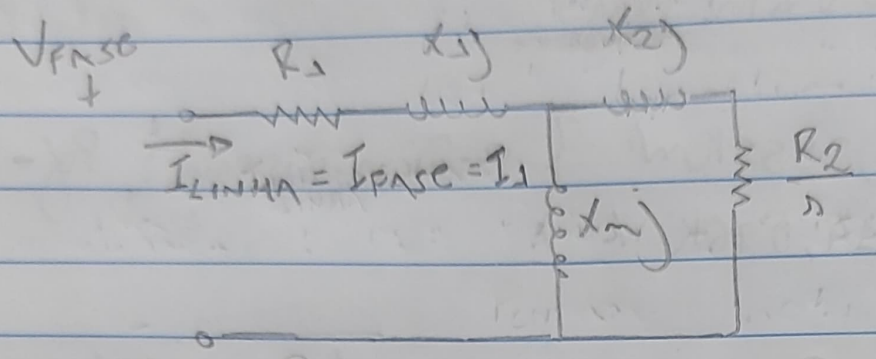
$P = 6$

$P_{IN} = 7{,}5\,kW$

$fe = 60\,Hz$

$P_{ROT} = 403\,W$

$s = 0{,}02$



$R_1 = 0{,}294\ \Omega$

$X_{1j} = 0{,}503j\ \Omega$

$R_2 = 0{,}144\ \Omega$

$X_{2j} = 0{,}209j\ \Omega$

$jX_m = j13{,}25\ \Omega$

Velocidades:

$$n_s = \frac{120}{P} fe = \frac{120}{6}(60) = 1200\ RPM$$

$$s = \frac{n_s - n_m}{n_s}$$

$$n_s s - n_s = -n_m$$

$$n_m = n_s - n_s s = n_s(1 - s)$$

$$n_m = n_s(1 - s) = 1200(1 - 0{,}02) = 1176\ RPM$$

$$w_s = \frac{4\pi fe}{P} = \frac{4\pi 60}{6} = 125{,}66\ RAD/s$$

$$s = \frac{w_s - w_m}{w_s} \rightarrow w_m = (1 - s) w_s$$

$$w_m = (1 - 0{,}02)(125{,}66) = 123{,}15\ RAD/s$$

O conjulgado:

$$Z_{eq} = [R_1 + X_{1j}] + \underbrace{X_m j /\!/ [X_{2j} + \frac{R_2}{s}]}_{Z}$$

$$Z = \frac{X_m j [X_2 j + R_2/s]}{X_m j + [X_2 j + R_2/s]}$$

$$Z = \frac{j13,25\left(0,20j + \frac{0,144}{0,02}\right)}{j13,25 + 0,20j + \frac{0,144}{0,02}} = 6,25 \angle 0,52\ \Omega$$

$$Z_{eq} = [5,42 + j3,08] + 0,294 + 0,503j$$

$$Z_{eq} = 6,76 \angle 32,26^\circ\ \Omega$$

F.P

$$V_{FASE} = I_1 = \frac{220/\sqrt{3}}{Z_{eq}} = \frac{}{6,76 \angle 32,26^\circ} = 18,77 \angle -32,26$$

$$P_{ESTATOR} = q|I_1|^2 R_1 = 3(18,77)^2(0,294) = 311,05W$$

↳ POTÊNCIA DISSIPADA NO ENTOLAMENTO DE COBRE DO ESTATOR

$$P_{IN} = q|V_1||I_1|\cos\theta = 3(127)(18,77)\cos(32,26)$$

$$P_{IN} = 6048,25\ W$$

$$P_g = P_{IN} - P_{ESTATOR} = 6048,25 - 311,05 = 5737,20\ W$$

$$P_{CONV} = (1-s)P_g = P_{EIXO} + P_{ROT}$$

$$P_{EIXO} = (1-s)P_g - P_{ROT} = (1-0,02)5737,2 - 403$$

$$P_{EIXO} = 5219,45\ W$$

$$T_{EIXO} = \frac{P_{EIXO}}{\omega_m} = \frac{5210,45}{123,15} = 42,38 \text{ N.m}$$

POTÊNCIA DE SAÍDA: $P_{EIXO} = 5210,45$ W

FATOR DE POTÊNCIA: 0,32 INDUTIVO

CORRENTE NO ESTATOR: $I_1 = 18,77 \angle -32,26°$ A

O rendimento: $\eta = \frac{P_{EIXO}}{P_{ENTRADA}} = \frac{5210,45}{6048,25} = 0,86$