

3-3. (1) 会. 因为定子和磁极产生相对运动, 会对定子有力的作用.  
而定子不动. 反作用力使得转子旋转.

(2). 顺时钟

$$(1) \quad 2p=4. \quad p=2. \quad n_s = \frac{60f}{p} = \frac{60 \times 50 \text{ Hz}}{2} = 1500 \text{ r/min}$$

$$s = \frac{n - n_s}{n_s} = \frac{1500 - 1410}{1500} = 0.04$$

3-4 (1)  $U_N = 220 \text{ V}$ . 三相  $\Rightarrow m=3$ .

$$\text{由 } P_2 = P_N. \quad P_2 = P_1 \cdot \eta_N = 3 U_N I_N \cos \phi_N \eta_N$$

$$\text{知 } I_N = 64.745 \text{ A}.$$

$$(2) \quad n_s = \frac{60f}{p} = \frac{3000}{p}. \quad \text{故 } p=2. \text{ 这样 } n_N \text{ 才是正常的.}$$

$$(3) \quad s_N = \frac{n_s - n_N}{n_s} = \frac{1500 - 1450}{1500} = 0.033.$$

$$3-13. (1) \quad m=3. \quad 2p=6 \Rightarrow p=3. \quad n_s = \frac{60f_1}{p} = 1000 \text{ r/min}.$$

$$s_N = \frac{n_s - n_N}{n_s} = 0.05$$

$$(2) \quad P_{mec} = P_{mec} + P_{ad} + P_N = 20850 \text{ W}$$

$$\frac{P_{mec}}{1-s} = \frac{P_{cu2}}{s}$$

$$P_{cu2} = \frac{s}{1-s} P_{mec} = 1.5184 \text{ kW}.$$

$$(3) P_1 = P_u + P_{cu1} + P_{fe} + P_{cu2} + P_{mec} + P_{ad} \\ = 31868 \text{ W}.$$

$$\eta_u = \frac{P_u}{P_1} = 87.86\%.$$

$$(4) P_1 = \sqrt{3} U_N I_N \cos \phi_N \Rightarrow I_N = 55.0209 \text{ A} \\ m=3$$

$$(5) f_2 = s \cdot f_1 = s_N \cdot 50 \text{ Hz} = 2.5 \text{ Hz}.$$

$$3-14. P_{mecN} = P_u + P_{ad} + P_{mec} = 10297 \text{ W}.$$

$$\frac{P_{mecN}}{1-s} = \frac{P_{cu2}}{s} \Rightarrow \frac{1-s}{s} = \frac{1}{s} - 1 = \frac{P_{mecN}}{P_{cu2}}$$

$$s_N = 0.0296$$

$$n_s = \frac{60 \cdot f_1}{p} = \frac{60 \cdot 50}{2} = 1500 \quad s_N = \frac{n_s - n_N}{n_s}$$

$$n_N = 1455.6 \text{ r/min} \approx 1456 \text{ r/min}.$$

$$T_{em} = \frac{P_{em}}{2\pi \cdot n_s / 60} = \frac{30 (P_{mec} + P_{cu2})}{\pi \cdot n_s} = 67.5517 \text{ N}\cdot\text{m}.$$

$$T_N = \frac{P_N}{2\pi n_N / 60} = \frac{30}{\pi} \cdot \frac{P_N}{n_N} = 65.6039 \text{ N}\cdot\text{m}.$$

$$T_0 = T_{em} - T_N = 1.9479 \text{ N}\cdot\text{m}.$$