

Electricité série T1 - Epreuve du 2^e gr.

Corrigé

1.1 $U_{\text{enroulement}} = U_{\text{réseau}} \Rightarrow$ Couplage triangle

1.2 $n_s = \frac{f}{p} = \frac{50}{2} = 25 \text{ tr/s}$ soit 1500 tr/min

$$n = n_s (1 - g) = 1500 (1 - 0,04) = 1500 \times 0,96$$

$n = 1440 \text{ tr/min}$ 3 pts

1.3 $C_u = \frac{P_u}{\Omega} = \frac{P_u}{2\pi n} = \frac{3 \cdot 10^3}{2\pi \cdot 1440 / 60} = \frac{3000}{150,72}$

$C_u = 19,9 \text{ N.m}$ 3 pts

2.1 $P_a = P_{am} + P_{al} = P_{um} + P_{al}$

$$P_a = \frac{3000}{0,8} + 3 \times 60 = 3750 + 180 = 3930 \text{ W}$$

$P_a = 3930 \text{ W}$ 3 pts

2.2 $Q_a = Q_{am} + Q_{al}$ or $Q_{al} = 0$

$$Q_a = Q_{am} = P_{am} \cdot \text{tg} \varphi_m$$

$$Q_a = 3750 \times 0,75 = 2812,5 \text{ Vars}$$

$Q_a = 2812,5 \text{ Vars}$ 3 pts

2.3 $S^2 = P_a^2 + Q_a^2 = 15444900 + 7910156,25$

$$S^2 = 23335056,25$$

$$S = 4832,7 \text{ VA}$$

$$I = \frac{S}{\sqrt{3}U} = \frac{4832,7}{\sqrt{3} \times 400} = 6,97 \text{ A}$$

$I = 6,97 \text{ A}$ 4 pts