1. $T_e = k_t I_a \qquad V_e = k_e \omega$

$P = 12 \times 0.8 = 9.6\,V$

$n = \frac{P_{out}}{P_{in}}$

$P_{out} = 9.6 \times 0.8$

$= 7.68.$

$P_{dep} = T_e \cdot \omega$

$7.68 = T_e \cdot 2\pi\left(\frac{3600}{60}\right)$

$T_e = 0.02037 = 20.4\,mNm.$

2. $P = 12W. \qquad I^2R = 1 \quad R = 1.$

$V_e = 12 - 1 - 0.8 = 10.2\,V$

$\omega = \frac{V_e}{0.1} = 102\ rad/s.$

$= 974$

$k_t = k_e = 0.1\ \frac{V}{rad/s}$

3. $\omega = 1200.\qquad k_e = 0.0318.$

$V_e = 0.0318 \times 2\pi \frac{2\pi \times 1200}{60}$

$= 8.33V$

$\frac{12 - 8.33}{12} = 0.3A.$