

Qu. 9

From lecture notes the frictional torque is given by:

$$T_f = \mu_k W r$$

In this case $\mu_k = 0.0075$

$$W = 206 \text{ N}$$

$$r = \frac{1}{2} (50 \times 10^{-3}) \text{ m}$$

$$\begin{aligned} \therefore T_f &= 0.0075 \times 206 \times \frac{1}{2} \times 50 \times 10^{-3} \\ &= \underline{38.63 \times 10^{-3} \text{ Nm}} \end{aligned}$$

Power loss is given by $T_f \times \omega$

$$\text{where } \omega = \frac{580 \times 2\pi}{60} \text{ rad/s}$$

$$\begin{aligned} \therefore \text{Power loss} &= 0.0386 \times \frac{580 \times 2\pi}{60} \\ &= \underline{2.35 \text{ W}} \end{aligned}$$