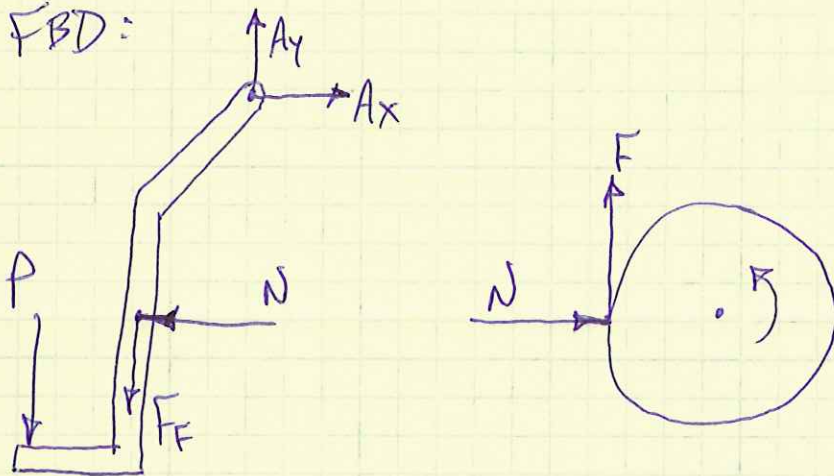


PROB. 17-12

$$I = 14 \text{ ft} \cdot \text{lb} \cdot \text{s}^2, \mu_k = 0.35, \omega_0 = 360 \text{ RPM} = 12\pi \frac{\text{RAD}}{\text{s}} \text{ CCW}$$

$$\text{FIND } P \text{ FOR } \Delta\theta = 100 \text{ REV} = 200\pi \text{ RAD}, \omega_f = 0$$

FBD:



$$\sum M_A = 0 \uparrow: 9P + 2F_F - 10N = 0$$

$$F_F = \mu_k N, N = \frac{F_F}{\mu_k}$$

$$9P + 2F_F - 10 \frac{F_F}{\mu_k} = 0$$

$$F_F = \frac{9P}{\left(\frac{10}{\mu_k} - 2\right)}$$

$$T_1 + \mu_{1-2} = T_2 \rightarrow 0$$

$$\frac{1}{2} I \omega_0^2 - M \cdot \Delta\theta = 0$$

$$M = r F_F = \frac{9Pr}{\left(\frac{10}{\mu_k} - 2\right)}$$

$$\frac{1}{2} I \omega_0^2 - \frac{9Pr \cdot \Delta\theta}{\left(\frac{10}{\mu_k} - 2\right)} = 0$$

PROB. 17-12 CONT.

$$P = \frac{I \omega_0^2}{18V \cdot A\theta} \cdot \left(\frac{10}{\mu K} - 2 \right)$$

$$P = \frac{(14 \text{ ft} \cdot 16 \cdot \text{s}^2) \left(12\pi \frac{\text{RAD}}{\text{s}} \right)^2 \left(\frac{10}{0.35} - 2 \right)}{18 \left(\frac{8}{12} \text{ ft} \right) (200\pi \text{ RAD})} = 70.12 \text{ LB}$$