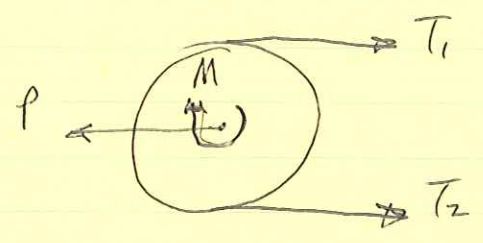


PROB. 8.127

$R = 60 \text{ mm}, P = 900 \text{ N}, \mu_s = 0.35$

FIND M_{max}, T

FBD PULLEY A:



$\frac{T_2}{T_1} = e^{\mu_s \beta}, \beta = \pi$

$T_2 = T_1 e^{\pi \mu_s}$

$\sum F_x = 0: T_1 + T_2 = P, T_1 = P - T_2$

$T_2 = (P - T_2) e^{\pi \mu_s}$

$T_2 (1 + e^{\pi \mu_s}) = P e^{\pi \mu_s}$

$T_2 = \frac{P e^{\pi \mu_s}}{1 + e^{\pi \mu_s}} = \frac{(900 \text{ N}) e^{\pi(0.35)}}{1 + e^{\pi(0.35)}} = 675 \text{ N}$

$T_1 = P - T_2 = 900 - 675 = 225 \text{ N}$

$\sum M_c = 0 \Rightarrow (0.06 \text{ m})(675 \text{ N}) - (0.06 \text{ m})(225 \text{ N}) - M = 0$

$M = 27 \text{ N-m}$