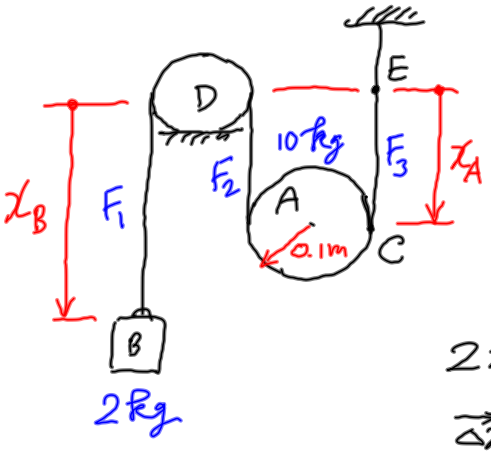
17.90 on page 796

$\mu_s = 0.25, \quad \mu_k = 0.2$

$\vec{q}_B = 1\text{ m} \uparrow$, system released from rest

$\vec{v}_B = ?$



Constraint condition:

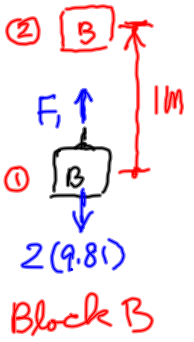
$x_B + x_A + x_A = k$

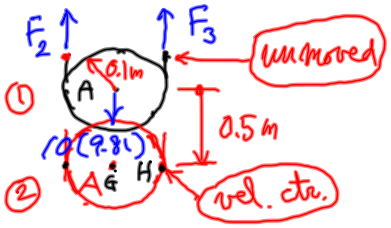
$2x_A + x_B = k$ $\qquad 2(\Delta x_A) + \Delta x_B = 0$

$\Delta x_B = \vec{q}_B = 1\text{ m} \uparrow \quad \therefore \Delta x_B = -1\text{ m}$

$2(\Delta x_A) + (-1) = 0 \quad \therefore \Delta x_A = 0.5\text{ m}$

We may let the tensions in the segments of the cord be F_1, F_2, & F_3, as indicated.





$I_H = \bar{I} + md^2 = \frac{1}{2}mr^2 + mr^2$

(Statics) $\mu_k = 0.2$, $\beta = \pi$ rad

Belt friction around drum D

$v_B = 2r\omega = 2(0.1)\omega = 0.2\omega$

$\omega = \frac{v_B}{0.2}$

$T_1 + U_{1\to 2} = T_2$ for block B

$0 + \left[2(9.81)(-1) + F_1(1)\right] = \frac{1}{2}(2)v_B^2$ ..... (1)

$T_1 + U_{1\to 2} = T_2$ for disk A

$0 + \left[F_2(-1) + 10(9.81)(0.5)\right] = \frac{1}{2}\left[\frac{1}{2}(10)(0.1)^2 + 10(0.1)^2\right]\left(\frac{v_B}{0.2}\right)^2$ ..... (2)

Belt friction in statics for belt friction around drum D

$F_2 = F_1 e^{0.2\pi}$ $\qquad (T_2 = T_1 e^{\mu_k \beta})$ ..... (3)

$\therefore F_1 = \square, \quad F_2 = \square, \quad v_B = \square$ $\qquad \vec{v}_B = \square \uparrow$