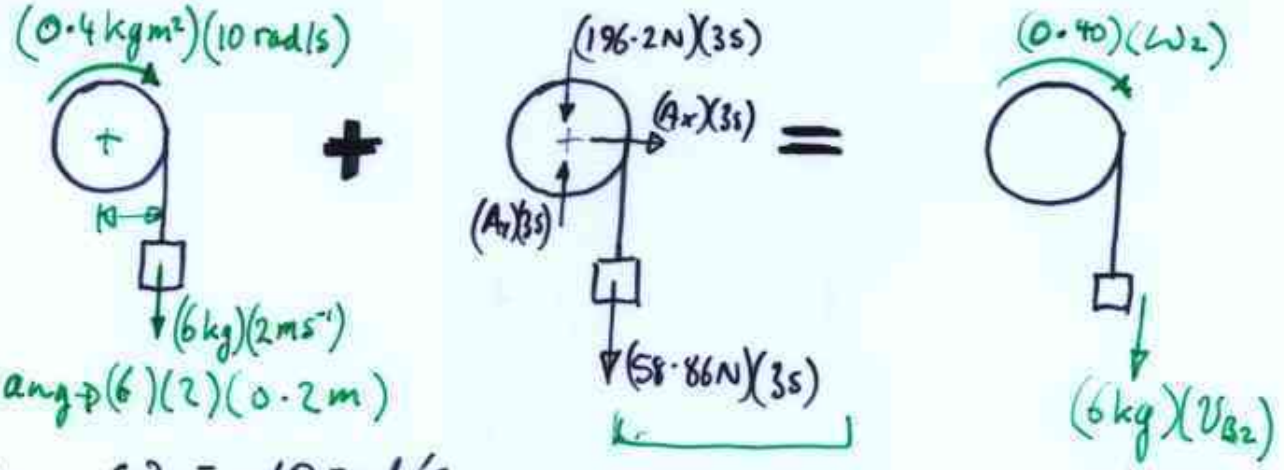
IN this way

$$\left(\sum \begin{matrix}\text{Sys Ang.}\\ \text{Momentum}\end{matrix}\right)_{A,1} + \left(\sum \begin{matrix}\text{Sys. Ang}\\ \text{Impulse}\end{matrix}\right)_{A\,1\to 2} = \left(\sum \begin{matrix}\text{Sys Ang}\\ \text{Momentum}\end{matrix}\right)_{A,2}$$



Again $\omega_1 = 10\ \text{rad/s}$

$\omega_2 = 5\, v_{B2}$

$$\oplus \left[\underbrace{(6\text{kg})(2\text{m/s})(0.2\text{m})}_{\text{BLOCK}} + \underbrace{(0.40\ \text{kgm}^2)(10\ \text{rad/s})}_{\text{DISC}}\right]$$

$$+ \left[(58.86\ \text{N})(3\text{s})(0.2\text{m})\right]$$

$$= \left[(6\text{kg})(v_{B2})(0.2\text{m}) + (0.40\ \text{kgm}^2)(5 v_{B2})\right]$$

Solve to get

$$v_{B2} \approx 13.0\ \text{m/s}$$