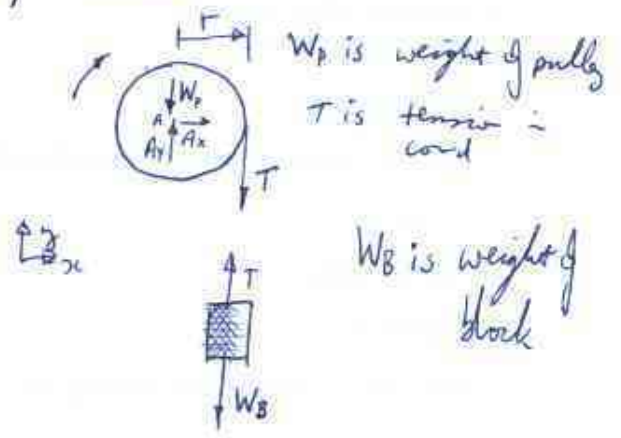


Alternative approach to pulley & block problem

in class, an impulse & momentum approach was followed but there are other ways to solve problem

Again, DRAW F.B.D. for Block & for pulley



for pulley $\Sigma M_A = I_A \alpha$

$$\Rightarrow \textcircled{1} \quad T r = I_A \alpha$$

$$\text{ \& } T = \frac{I_A \alpha}{r} \quad \textcircled{*}$$

for block $\Sigma F_y = m a_y \quad \downarrow + \Rightarrow W_b - T = m a_y$

note $W_b = m g \quad \Rightarrow T = W_b - m a_y \quad \textcircled{2}$

note, from kinematics that a_y for block is related to α
 $a_y = r \alpha \quad \& \quad \alpha = \frac{a_y}{r} \quad \text{subst into } \textcircled{*}$

$$\Rightarrow T = \frac{I_A a_y}{r^2} \quad \textcircled{P}$$

equating $\textcircled{P} = \textcircled{2} \quad \frac{I_A a_y}{r^2} = W_b - m a_y$

$$\Rightarrow a_y = \frac{W_b}{\left(\frac{I_A}{r^2} + m\right)} = \frac{(6)(9.81)}{\left(\frac{0.4}{(0.2)^2} + 6\right)} = 3.68 \text{ m s}^{-2}$$

$$v_{B2} = v_{B1} + a t$$

$$= 2 + (3.68)(3)$$

note that this is effectively an integration

$$v_{B2} = 13.04 \text{ m/s}$$

SAME ANSWER