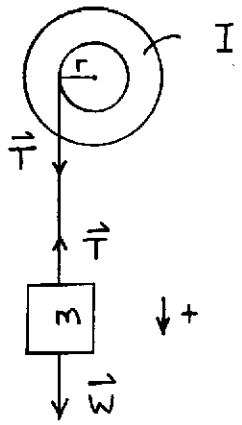
C2.



For mass m, $\Sigma \vec{F} = m\vec{a}$

$W - T = ma$

$mg - T = ma$

$T = mg - ma$

For pulley,

$\Sigma \tau = I\alpha$

$Tr = I\alpha$

$$\alpha = \frac{Tr}{I} = \frac{(mg - ma)r}{I}$$

Note that a of mass $= a_T$ of rim of pulley

$= r\alpha$

so $$\alpha = \frac{(mg - m(r\alpha))r}{I}$$

$$I\alpha = mgr - mr^2\alpha$$

$$I\alpha + mr^2\alpha = mgr$$

$$\alpha(I + mr^2) = mgr$$

$$\alpha = \frac{mgr}{I + mr^2} = \frac{(2.00\,kg)(9.80\,m/s^2)(0.0500\,m)}{0.469\,kg.m^2 + (2.00\,kg)(0.0500\,m)^2}$$

$$\alpha = 2.07\ rad/s^2$$