PROB. 4.43

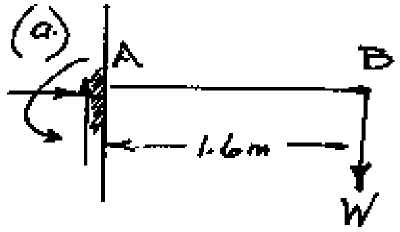
p. 173

mass = 8 kg

$W = mg = 78.48^N$

pulley radius = 100 mm = moment arm for cable tension

(a.)



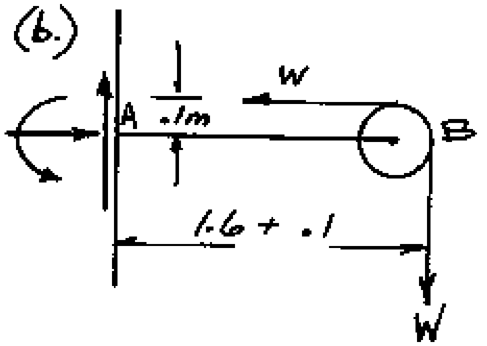
$\Sigma F_x = 0 = R_{Ax}$

$\Sigma F_y = 0 = R_{Ay} - W \quad \therefore \boxed{R_{Ay} = 78.48^N \uparrow}$

$\Sigma M_A = 0 = M_A - W(1.6\,m)$

$\boxed{M_A = 125.568\ \text{N-m. CCW}}$

(b.)



$\Sigma F_x = 0 = R_{Ax} - W \quad \therefore R_{Ax} = 78.48^N$

$\Sigma F_y = 0 = R_{Ay} - W \quad \therefore R_{Ay} = 78.48^N$

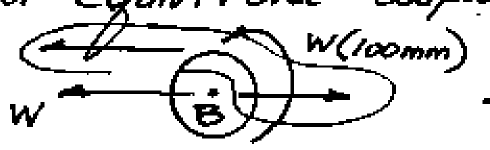
$R = \sqrt{R_x^2 + R_y^2} \doteq \boxed{111^N \angle 45°}$

$\Sigma M_A = 0 = M_A + W(.1m) - W(1.6 + .1m)$ EXPAND and see what happens.

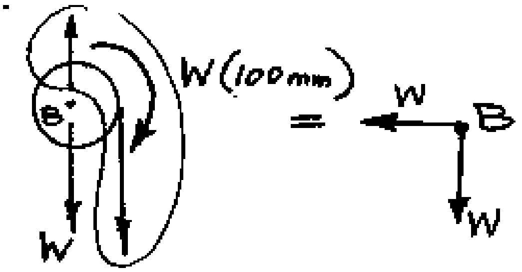
$M_A = -W(.1) + W(1.6) + W(.1m)$

$\boxed{M_A = 125.568\ \text{N-m}}$

Consider equiv. Force - Couple at B.

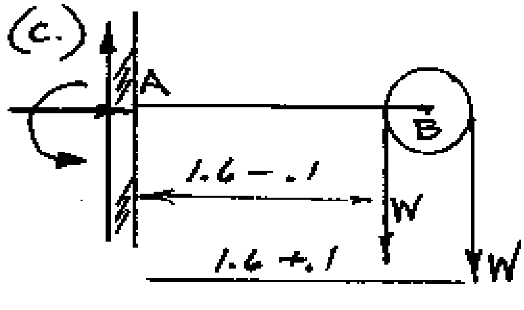


+



The moments about B CANCEL.

(c.)



$\Sigma F_x = 0 = R_{Ax}$

$\Sigma F_y = 0 = R_{Ay} - W - W \quad \therefore \boxed{R_{Ay} = 156.96^N \uparrow}$

$\Sigma M_A = 0 = M_A - W(1.6 - .1) - W(1.6 + .1)$

$\boxed{M_A = 156.96(1.6m) = 251.136^N m}$

NOTE: Equiv. Force - Couple Sys. at B.