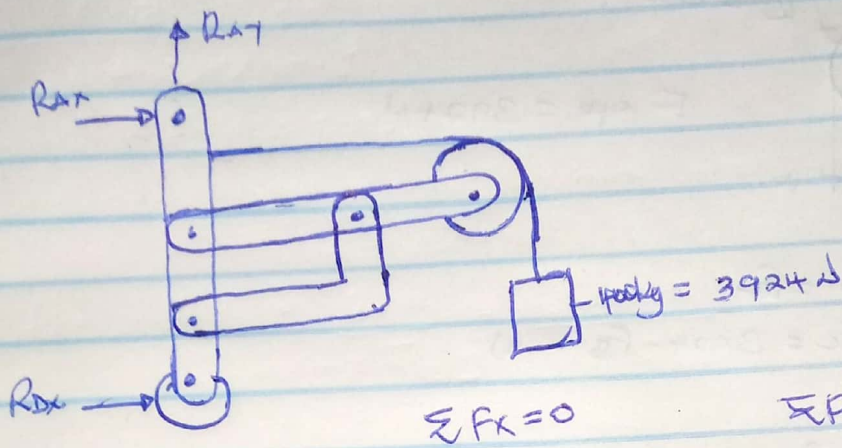
Problem 1

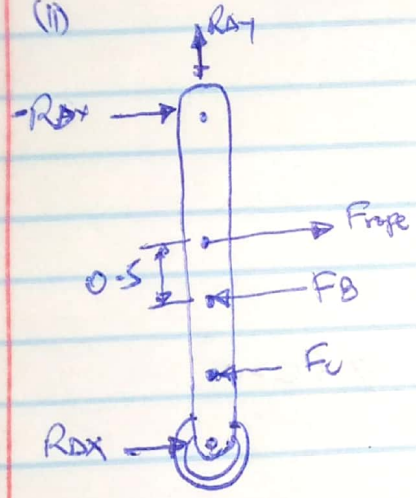


$\Sigma F_X = 0$ $\quad$ $\Sigma F_Y = 0$

$R_{AX} + R_{DX} = 0$ $\quad$ $-3924 + R_{AY} = 0$

$R_{AX} = -R_{DX}$ $\quad$ $R_{AY} = 3924\,N$

(ii)



For equilibrium

$\Sigma F_X = 0$

$-R_{DX} + R_{DX} - F_C + F_{rope} - F_B = 0$

$F_{rope} - F_B = F_C$ -- (i)

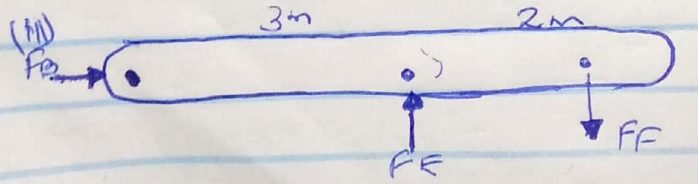
Σ Moments about B = 0

$\Sigma M_B = 0$

$F_{rope} \times 0.5 + F_C \times 1.5 + R_{DX}(3) - R_{DX} 2 = 0$

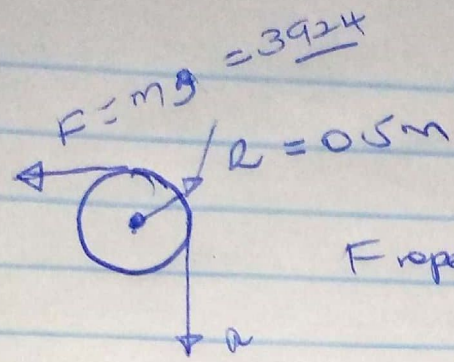
$0.5\,F_{rope} + 1.5\,F_C - 5R_{DX} = 0$

$F_{rope} + 3F_C = 10\,R_{DX}$ -- (ii)



$\Sigma M_B = 0$, $3F_E = 2F_F$ -- (iii)

(iv)



$F_{rope} - F_B = F_C$

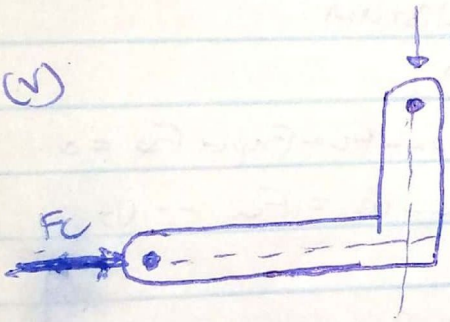
$F_C = 3924 - F_B$ --(4)

$10R_{Dx} = 3924 + 3F_C$

$= 3924 + (3924 + F_B)3$

$10R_{Dx} = 15696 - 3F_B$

(v)



$\Sigma F_x = 0$

$F_C = 0$

$\Sigma f_y = 0 \Rightarrow F_E = 0$

$\therefore F_B = 3924 - F_C = 3924N$

$10R_{Dx} = 15696 - 3F_B = 15696 - 3(3924) = 3924$

$R_{Dx} = 392.4$

From eqn (ii) previous page $F_F = 0$