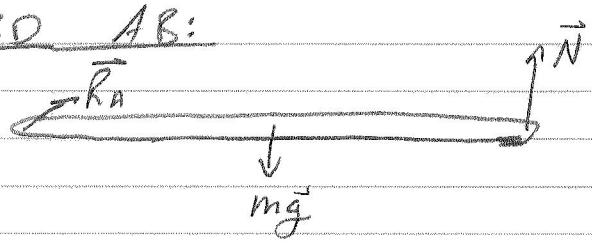
16.86

1) a_c & F_B

2) Newton's Laws

FBD AB:



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

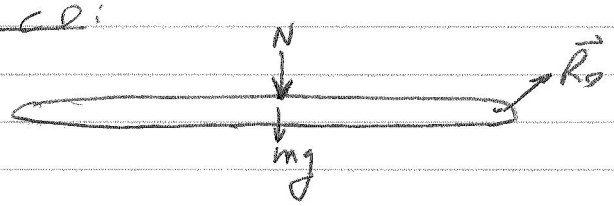
$\Sigma F_y = m a_{1y} = R_{Ay} - mg + N$ ①

$\Sigma M_A = I \alpha_1$

$-mg\frac{l}{2} + Nl = \frac{1}{3} m l^2 \frac{a_{1y}}{\frac{l}{2}}$

$-mg\frac{1}{2} + N = \frac{2}{3} m a_{1y}$ ②

FBD CD:



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

$\Sigma F_y = m a_{2y} = -N - mg + R_{Dy}$ ③

$\Sigma M_D = I \alpha_2$

$+N\frac{l}{2} + mg\frac{l}{2} = -\frac{1}{3} m l^2 \frac{a_{2y}}{\frac{l}{2}}$ ④

$N + mg = -\frac{4}{3} m a_{2y}$ ⑤

$a_{2y} = 2 a_{1y}$ from kinematics. ⑥

Using ②, ⑤ and ⑥

$$+\frac{3}{2} mg = -\frac{5}{3} m a_{2y}$$

$$a_{2y} = \frac{-9}{10} g$$

Since $a_c = 2 a_{2y}$, $a_c = \frac{-18}{10} g$

From ⑤

$$N = -\frac{4}{3} m a_{2y} - mg$$

$$= -\frac{4}{3} m \frac{-9}{10} g - mg$$

$$= \frac{1}{5} mg$$