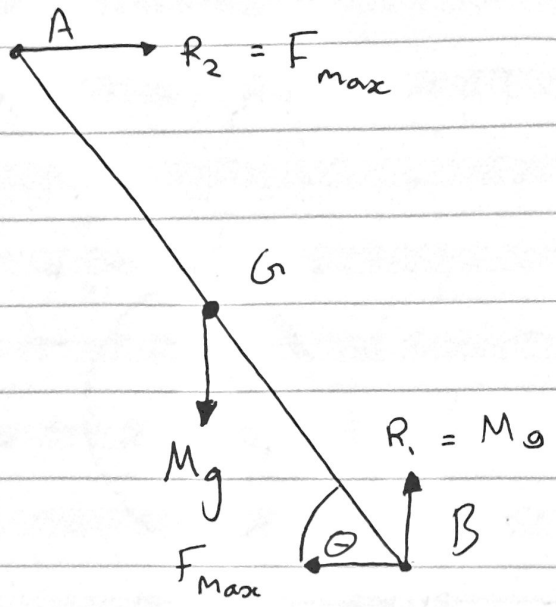
2021-10-04 Lecture 1.2



where $F_{max} = \mu R$

and $\mu = 0.5$

$$\therefore \quad \mu R = 0.5\, M_g = R_2$$

$$L_{AB} \times R_2 \sin\theta = 0.5 L_{AB} \times M_g \cos\theta$$

$$L_{AB} \times 0.5 M_g \sin\theta = 0.5 L_{AB} \times M_g \cos\theta$$

$$\sin\theta = \cos\theta$$

$$\theta = 45^\circ$$

Statics - Ex. Sheet 1, Part A

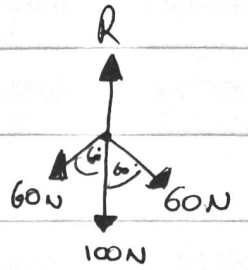
1.6) $\vec{F}_x = 0$

$F_y = 0$

$M_{xy} = 0$

Conditions come from 1st law.

1.7)

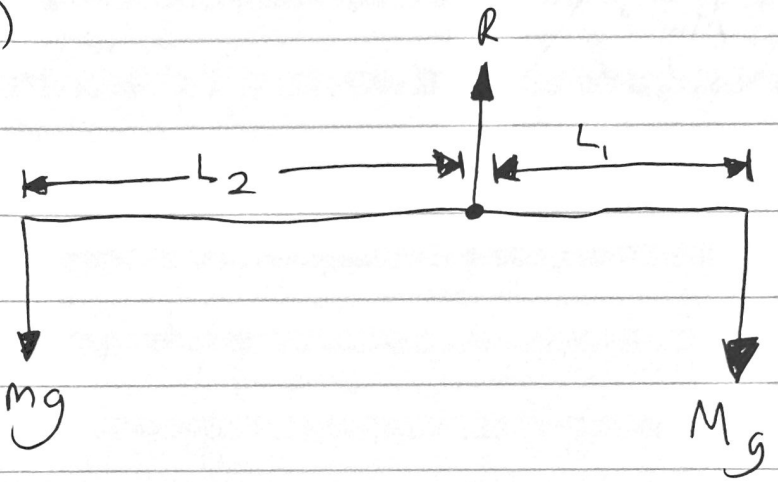


$F_y = R - 100 - 2 \times 60 \cos 60$

$R = 100 + 2 \times 60 \cos 60$

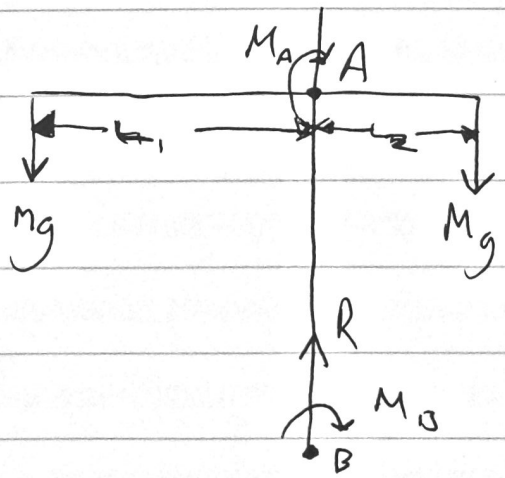
$= 160$ N vertically up

1.8) a)



b) $mL_2 = ML_1$

c)



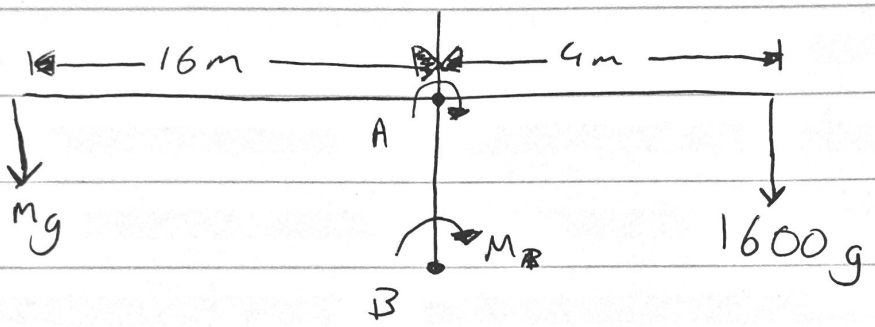
d) $M = 1600$ kg

$L_1 = 16$ m

$L_2 = 4$ m

$|M_A| \geq 6000$ Nm

$|M_B| \geq 6000$ Nm



$4 \times 1600g + 6000 = 16mg$

$\frac{4 \times 1600g + 6000}{16g} = m_{max}$

$= 440$ kg

$4 \times 1600g - 6000 = 16 m_{min} g$

$\frac{4 \times 1600g - 6000}{16g} = m_{min}$

$= 360$ kg