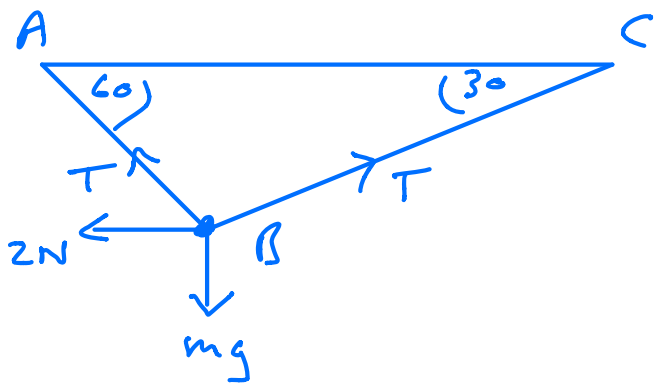
Ex 7B Q5

a)



Resolve $\leftrightarrow$

$$T\cos 60 + 2 = T\cos 30$$

$$2 = T(\cos 30 - \cos 60)$$

$$T = \frac{2}{(\cos 30 - \cos 60)}$$

$$T = 2 + 2\sqrt{3} = 5.46 \text{ N}$$

b)

Resolve $\updownarrow$

$$T\sin 60 + T\sin 30 = mg$$

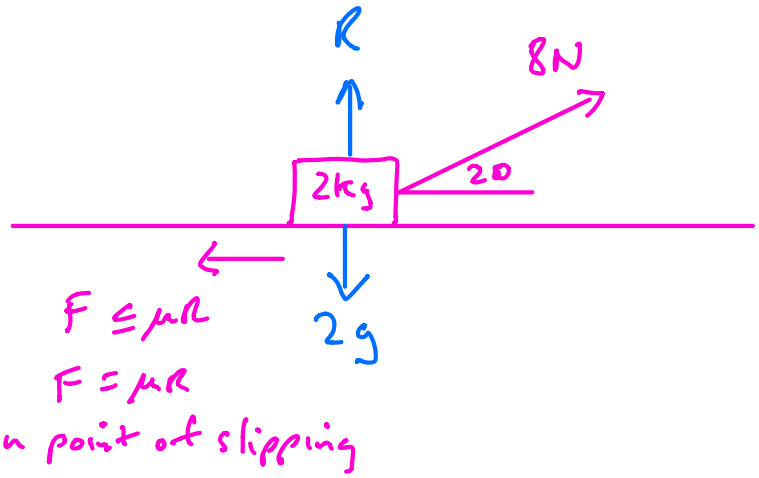
$$mg = T(\sin 60 + \sin 30)$$

$$m = \frac{5.4641(\sin 60 + \sin 30)}{9.8}$$

$$m = 0.76 \text{ Kg}$$

c) No friction between bead and string

Ex 7C Q1



$\updownarrow$ $R + 8\sin 20^\circ = 2g$

$R = 2g - 8\sin 20^\circ$

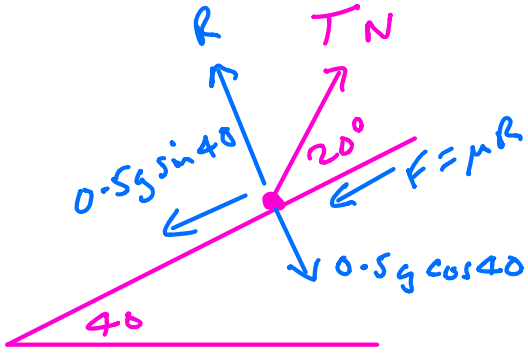
$\longleftrightarrow$ $F = 8\cos 20^\circ$

$\mu R = 8\cos 20$

$\mu = \dfrac{8\cos 20}{R} = \dfrac{8\cos 20}{(2g - 8\sin 20)}$

$\mu = 0.446$

11)



Mass 0.5 kg

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

On point of slipping up hill

Parallel to slope $\quad 0.5g\sin 40 + \mu R = T\cos 20$

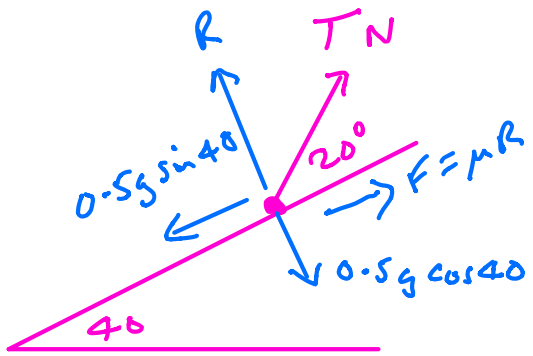
$\perp$ to slope $\quad R + T\sin 20 = 0.5g\cos 40$

$$T\cos 20 - \tfrac{1}{5}R = 0.5g\sin 40$$

$$T\sin 20 + R = 0.5g\cos 40$$

By calc $\quad T = 3.869\ N \qquad R = 2.430\ N$

Upper bound for $T = 3.87\ N$



On point of slipping down slope

$\parallel$ to slope $\quad T\cos 20 + \mu R = 0.5g\sin 40$

$\perp$ to slope $\quad T\sin 20 + R = 0.5g\cos 40$

By calc $\quad T = 2.753\ N \qquad R = 2.812\ N$

Lower Bound for $T = 2.75\ N$

$$2.75\ N \leq T \leq 3.87\ N$$

Classwork and Homework

Exercise 7B Q3, Q6, Q11

Exercise 7C Q8, Q9,