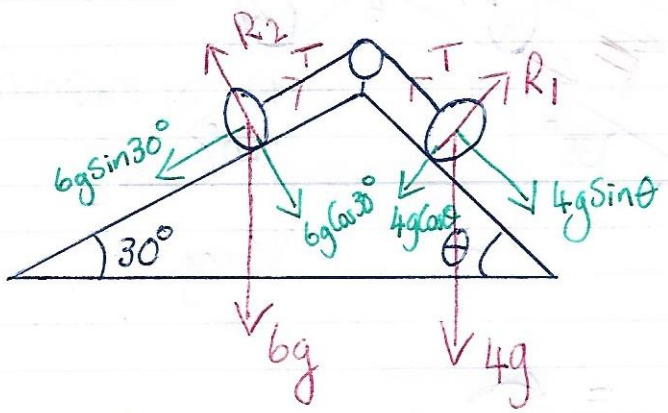
Double Inclined Plane : Equilibrium : Answers

1)



↷ = ↶

$6g\sin30^\circ = 4g\sin\theta$

$\div g$ $\div g$

$3 = 4\sin\theta$

$\frac{3}{4} = \sin\theta$

$48.6^\circ = \theta$

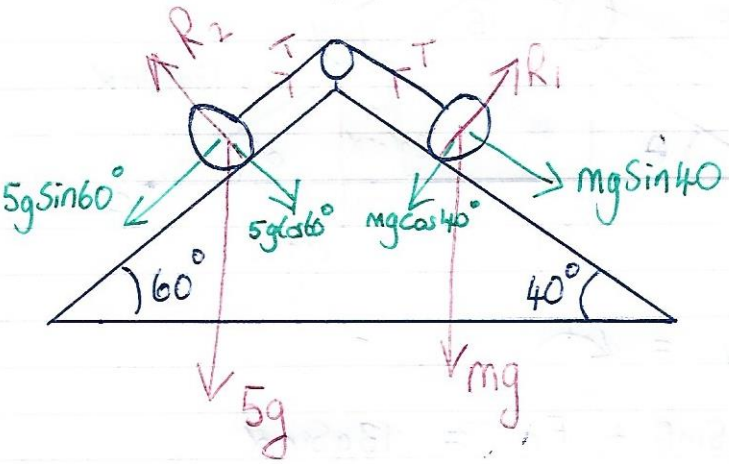
↙ 6kg mass

$6g\sin30 = T$

$3g\ N = T$

$29.4\ N = T$

2)



↷ = ↶

$5g\sin60^\circ = mg\sin40^\circ$

$\div g$ $\div g$

$4.33 = 0.643m$

$6.74\ kg = m$

↙ 5kg mass

$T = 5g\sin60^\circ$

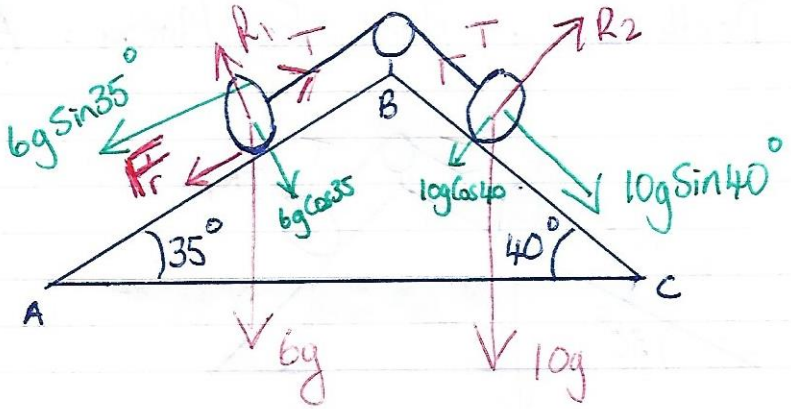
$T = 4.33g\ N$

$T = 42.4\ N$

OR

$T = \frac{49\sqrt{3}}{2}\ N.$

3)



↷ = ↶

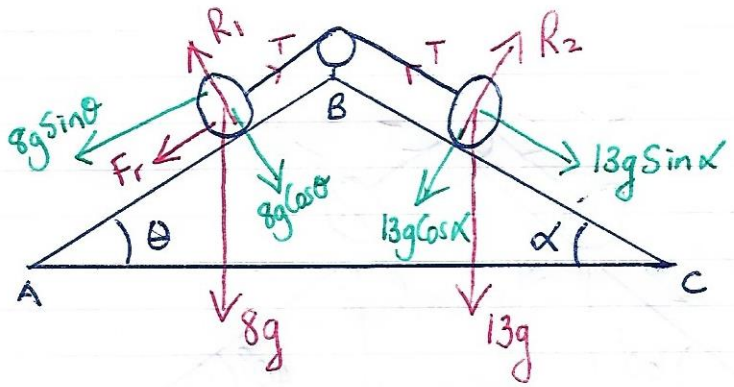
$$F_r + 6g\sin 35^\circ = 10g\sin 40^\circ$$

$$F_r = 6.43g - 3.44g$$

$$F_r = 2.99g\ N$$

$$F_r = 29.3\ N$$

4)



↷ = ↶

$$8g\sin\theta + F_r = 13g\sin\alpha$$

$$8g\left(\frac{3}{5}\right) + F_r = 13g\left(\frac{5}{13}\right)$$

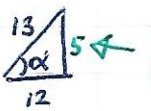
$$4.8g + F_r = 5g$$

$$F_r = 5g - 4.8g$$

$$F_r = 0.2g\ N$$

$$F_r = 1.96\ N$$

$\cos\alpha = \frac{12}{13}$



from pythag

$\sin\alpha = \frac{5}{13}$