

19804 Block

(A)

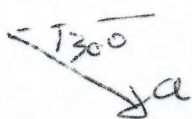
(B)

(a) masses

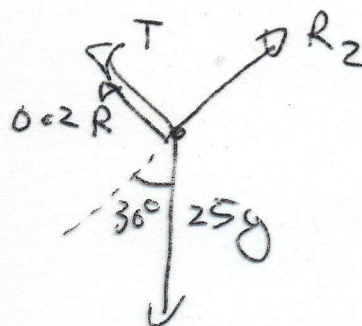
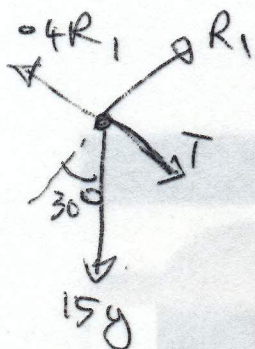
15

25

accel



forces



10

NII

$$ma = \sum F$$

⊥ plane:

$$0 = R_1 - 15g \cos 30^\circ \quad (1)$$

∥ plane

$$15a = T - 0.4R_1 + 15g \sin 30^\circ \quad (3)$$

⊥ plane

$$0 = R_2 - 25g \cos 30^\circ \quad (2)$$

∥ plane

$$25a = 25g \sin 30^\circ - T - 0.2R_2 \quad (4)$$

accel of Block A = accel of Block B

$$(1) \Rightarrow R_1 = 15g \cos 30^\circ \Rightarrow R_1 = \frac{15g\sqrt{3}}{2} \text{ or } 127.306$$

$$(2) \Rightarrow R_2 = 25g \cos 30^\circ \Rightarrow R_2 = \frac{25g\sqrt{3}}{2} \text{ or } 212.176$$

$$\therefore (3), (4) \Rightarrow 15a = T - 0.4 \left(\frac{15g\sqrt{3}}{2} \right) + \frac{15g}{2} \quad (5)$$

$$\text{and } 25a = -T - 0.2 \left(\frac{25g\sqrt{3}}{2} \right) + \frac{25g}{2} \quad (5)$$

$$\text{Adding } 40a = -11 \frac{g\sqrt{3}}{2} + 20g$$

$$a = \frac{1}{40} \left(-\frac{11g\sqrt{3}}{2} + 20g \right) = 2.566 \text{ ms}^{-2} \quad (5)$$

$$(ii) (3) \Rightarrow 15(2.566) = T - 0.4 \left(\frac{15g\sqrt{3}}{2} \right) + \frac{15g}{2} \Rightarrow T = 15.41 \text{ N} \quad (5)$$