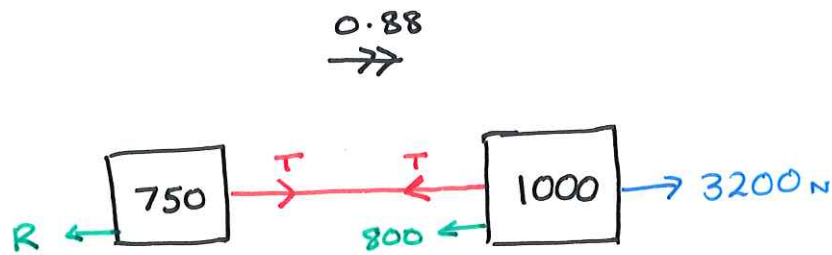


Q1.



(a) Caravan

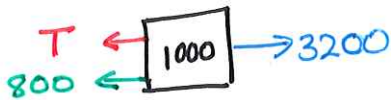


$$F = ma$$

$$T - R = 750(0.88)$$

$$T - R = 660$$

Car

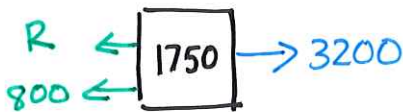


$$F = ma$$

$$3200 - T - R = 1000(0.88)$$

$$3200 - T - R = 880$$

Overall



$$F = ma$$

$$3200 - R - 800 = 1750(0.88)$$

$$2400 - R = 1540$$

$$R = \underline{\underline{860}}$$

(b)

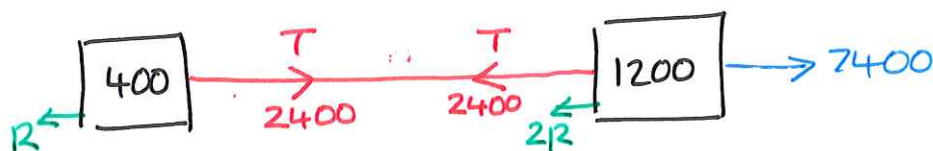
$$T - R = 660$$

$$T - 860 = 660$$

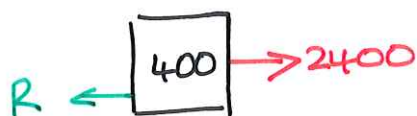
$$T = \underline{\underline{1520\text{ N}}}$$

Q2.

a
 $\rightarrow\rightarrow$



Caravan



$$F = ma$$

$$2400 - R = 400a$$

Car



$$F = ma$$

$$7400 - 2400 - 2R = 1200a$$

$$5000 - 2R = 1200a$$

Overall



$$F = ma$$

$$7400 - 3R = 1600a$$

caravan

$$(a) \quad R = 2400 - 400a$$

car

$$5000 - 2(2400 - 400a) = 1200a$$

$$5000 - 4800 + 800a = 1200a$$

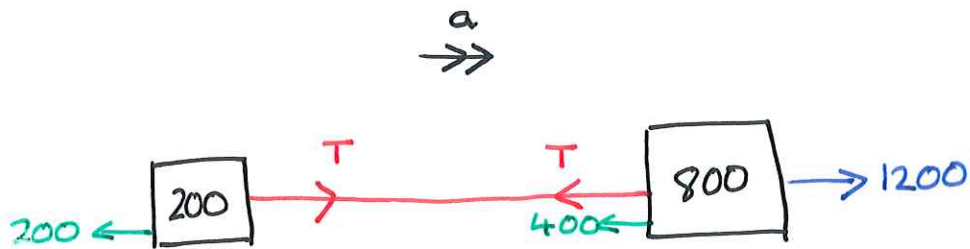
$$200 = 400a$$

$$a = \underline{\underline{0.5}}$$

(b) a_1 would be less than a

(c) resistance won't be constant

Q3.



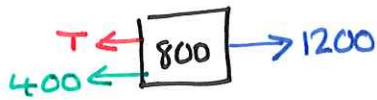
(a) Caravan



$$F = ma$$

$$T - 200 = 200a$$

Car



$$F = ma$$

$$1200 - T - 400 = 800a$$

$$800 - T = 800a$$

overall



$$F = ma$$

$$1200 - 600 = 1000a$$

$$600 = 1000a$$

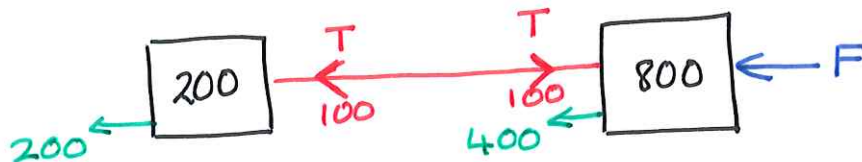
$$a = \frac{6}{10} = \underline{\underline{0.6}}$$

(b) $T - 200 = 200(0.6)$

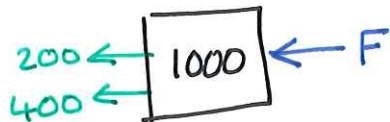
$$T = \underline{\underline{320 \text{ N}}}$$

Q3.

(c)



Overall



$$F = ma$$

$$0 - F - 600 = 1000a$$

$$F = -600 - 1000a$$

Caravan



$$F = ma$$

$$0 - 100 - 200 = 200a$$

$$-300 = 200a$$

$$a = -1.5$$

car



$$F = ma$$

$$100 - 400 - F = 800a$$

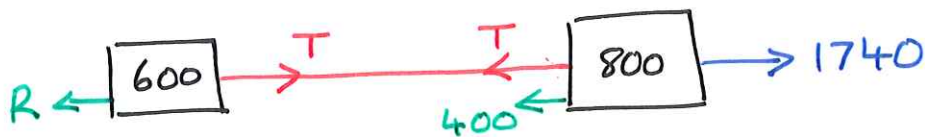
$$-300 - F = 800a$$

$$F = -600 - 1000(-1.5)$$

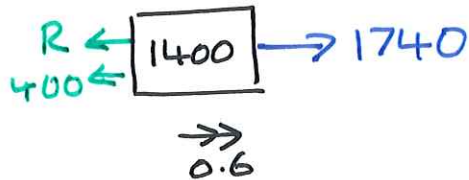
$$F = \underline{\underline{900 \text{ N}}}$$

Q4.

$\xrightarrow{0.6}$



(a) Overall



$$F = ma$$

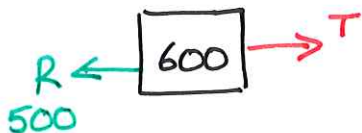
$$1740 - R - 400 = 1400(0.6)$$

$$1340 - R = 840$$

$$R = \underline{\underline{500 \text{ N}}}$$

(b)

Trailer



$$F = ma$$

$$T - 500 = 600(0.6)$$

$$T = \underline{\underline{860 \text{ N}}}$$

(c) Trailer



$$F = ma$$

$$0 - 500 = 600a$$

$$a = -\frac{5}{6} \quad \text{deceleration} = \underline{\underline{\frac{5}{6} \text{ ms}^{-2}}}$$

(d)

$$\begin{aligned} S &= 12.5 \\ V &= 0 \\ a &= -\frac{5}{6} \\ t & \end{aligned}$$

$$v^2 = u^2 + 2as$$

$$0 = 12.5^2 + 2\left(-\frac{5}{6}\right)s$$

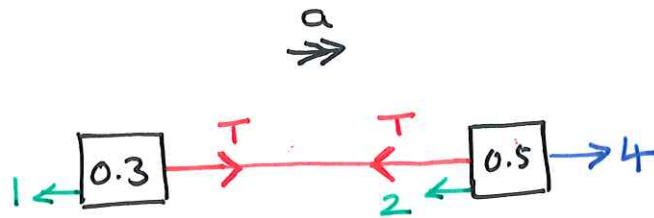
$$s = \underline{\underline{93.75 \text{ m}}}$$

(e)

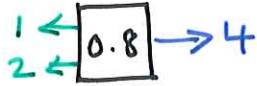
Resistance won't be consistent

Trailer will tip and drag on the road,

Q5.



(a) Overall



$$F = ma$$

$$4 - 1 = 0.8a$$

$$1 = 0.8a$$

$$a = \underline{\underline{1.25 \text{ ms}^{-2}}}$$

(b) S

$$v = 0$$

$$v$$

$$a = 1.25$$

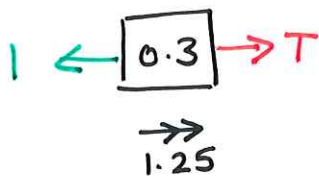
$$t = 6$$

$$v = u + at$$

$$v = 0 + (1.25)6$$

$$v = \underline{\underline{7.5 \text{ ms}^{-1}}}$$

(c) Caravan



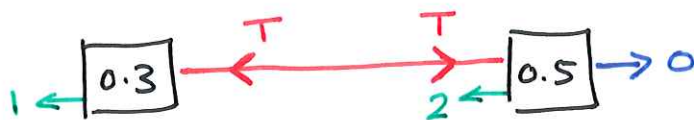
$$F = ma$$

$$T - 1 = 0.3(1.25)$$

$$T = \underline{\underline{1.375 \text{ N}}}$$

Q5.

(d)



overall



$$F = ma$$

$$0 - 3 = 0.8a$$

$$a = -3.75$$

S

$$u = 7.5$$

$$v = 0$$

$$a = -3.75$$

$$t =$$

$$v^2 = u^2 + 2as$$

$$0 = 7.5^2 + 2(-3.75)s$$

$$s = \underline{\underline{7.5m}}$$

(e)

Caravan



$$F = ma$$

$$0 - T - 1 = 0.3(-3.75)$$

$$-T - 1 = -1.125$$

$$T = 0.125$$