QUESTIONS WITH CARS, TRAILER, CARAVANS
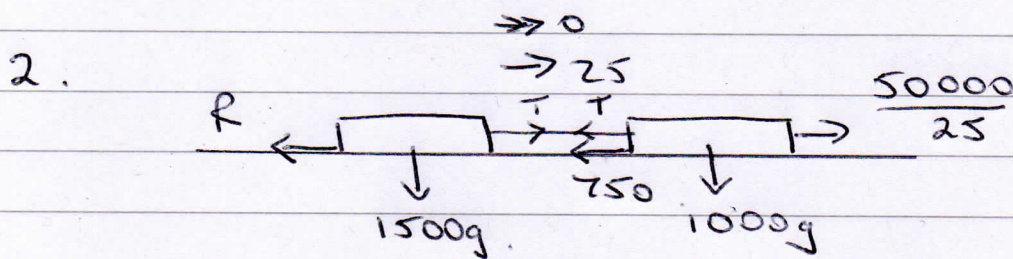
1. $KE_A = PE_B + W.D.$ against Resistance

$$\frac{1}{2} \times 500 \times 10^2 = 500g \times x \sin\alpha + 400x.$$

$$\frac{1}{2} \times 500 \times 10^2 = x \left(500g \times \frac{1}{10} + 400\right)$$

$$x = 28m.$$

Further distance moved is 28m.

2.

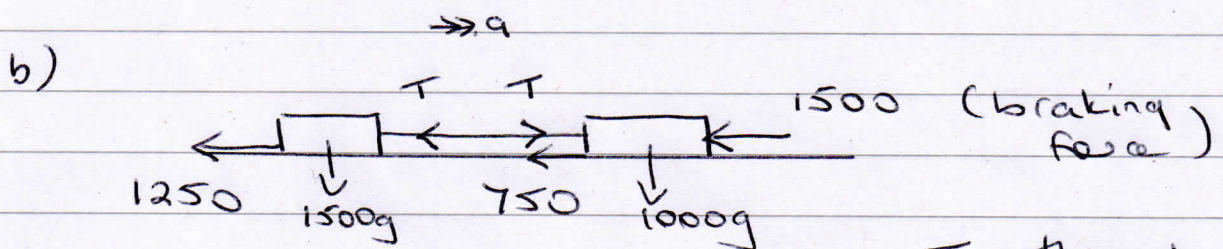
a) $[F = ma]$

$$\frac{50000}{25} - 750 - R = 0$$

$$R = 1250$$

b)

$[F = ma]$

$$0 - 1500 - 1250 - 750 = 2500a.$$

$$a = -1.4.$$

deceleration $1.4 ms^{-2}$.

2c) $[F=ma]$ trailer only

$$0 - 1250 - T = -1500 \times 1.4$$
$$T = 850N$$

d) Distance before coming to rest x.
$$[v^2 = u^2 + 2as]$$
$$0 = 25^2 + 2(-1.4)x$$
$$x = \frac{3125}{14}$$

$$INPUT = OUTPUT.$$
$$KE = WD \text{ against} + W.D \text{ by } BF.$$
$$\text{resistances}$$

$$\frac{1}{2} \times 2500 \times 25^2 = (750 + 1250) \times \frac{3125}{14} + WD \text{ by } BF.$$

$$W.D \text{ by } BF = 334821 J$$
$$= 335 KJ \quad (3sf)$$