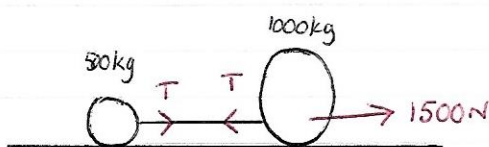


Connected Particles 3 : Answers

1)



You must SAY THIS

a) $Rf = ma$ whole system horizontally

$$1500 = 1500 a$$

$$1 \text{ m/s}^2 = a$$

b) $Rf = ma$ for car

$$1500 - T = 1000 (1)$$

$$1500 - 1000 = T$$

$$500 \text{ N} = T$$

choose either but not both

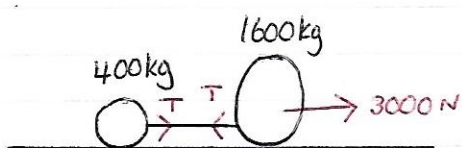
OR

$Rf = ma$ trailer

$$T = 500 (1)$$

$$T = 500 \text{ N}$$

2)



a) $Rf = ma$ whole system

$$3000 = 2000 a$$

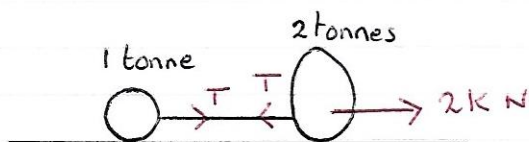
$$\frac{3}{2} \text{ m/s}^2 = a$$

b) $Rf = ma$ trailer

$$T = 400 \left(\frac{3}{2} \right)$$

$$T = 600 \text{ N}$$

3)



$$1 \text{ tonne} = 1000 \text{ kg}$$

$$1 \text{ kN} = 1000 \text{ N}$$

*

a) $Rf = ma$ whole system

$$2000 = 3000 a$$

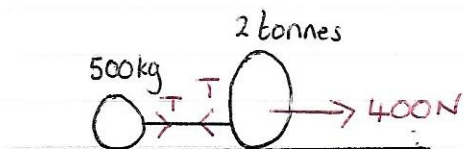
$$\frac{2}{3} \text{ m/s}^2 = a$$

b) $Rf = ma$ trailer

$$T = 1000 \left(\frac{2}{3} \right)$$

$$T = \frac{2000}{3} \text{ N}$$

4)



a) $Rf = ma$ whole system

$$400 = 2500 a$$

$$\frac{4}{25} \text{ m/s}^2 = a$$

$$0.16 \text{ m/s}^2 = a$$

b) $Rf = ma$ for car

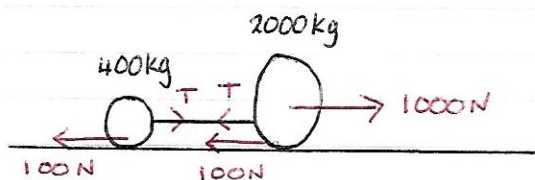
$$400 - T = 2000 \left(\frac{4}{25} \right)$$

$$400 - 320 = T$$

$$80 \text{ N} = T$$

For a change.
(trailer is easier)

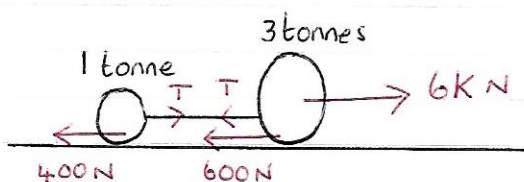
5)



a) $Rf = ma$ whole system
 $1000 - 100 - 100 = 2400 a$
 $\frac{800}{2400} = a$
 $\frac{1}{3} \text{ m/s}^2 = a$

b) $Rf = ma$ trailer
 $T - 100 = 400\left(\frac{1}{3}\right)$
 $T = \frac{400}{3} + \frac{300}{3}$
 $T = \frac{700}{3} \text{ N}$

6)



a) $Rf = ma$ whole system
 $6000 - 600 - 400 = 4000 a$
 $\frac{5000}{4000} = a$
 $\frac{5}{4} \text{ m/s}^2 = a$
 $\leftarrow 4 \text{ tonnes} = 4000 \text{ kg}$

b) $Rf = ma$ trailer
 $T - 400 = 1000\left(\frac{5}{4}\right)$
 $T = 1250 + 400$
 $T = 1650 \text{ N}$