

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 6 Connected particles

### Exercise A, Question 8

#### Question:

A breakdown truck tows a car of mass 1200 kg. Assume that the rope is horizontal and that the truck moves on a horizontal surface. Calculate the tension in the tow rope if the car is:

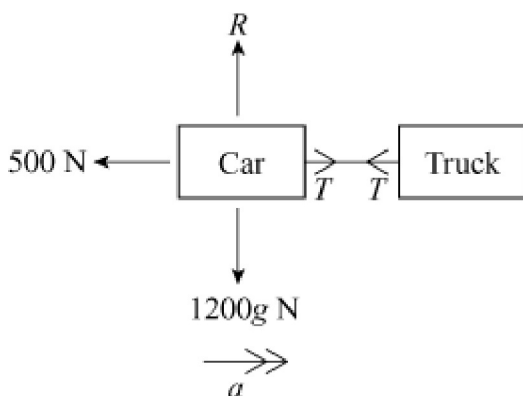
- (a) accelerating at  $0.5 \text{ m s}^{-2}$  and experiencing a resistance force of 500 N;  
 (b) travelling at constant speed but experiencing a resistance force of 400 N.

#### Solution:

- (a) Using  $F = ma$ , horizontally for the car,

$$\begin{aligned} T - 500 &= 1200a \\ &= 600 \quad (\text{since } a = 0.5) \end{aligned}$$

$\therefore$  Tension is 1100 N



- (b) Using  $F = ma$ , horizontally for the car,

$$\begin{aligned} T - 400 &= 1200a \\ &= 0 \quad \text{since } a = 0 \quad [\text{If travelling at constant speed, acceleration is zero}] \end{aligned}$$

$\therefore$  Tension is 400 N

