

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

5 Newton's laws of motion

Exercise Test yourself, Question 3

Question:

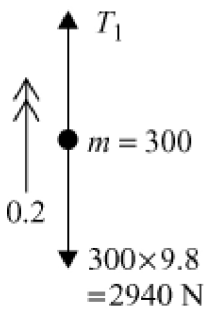
A lift and its passengers have a total mass of 300 kg. Find the tension in the lift cable if:

- (a) it accelerates upwards at 0.2 m s^{-2}
- (b) it accelerates downwards at 0.05 m s^{-2} .

Solution:

- (a) Newton's 2nd law, \uparrow

$$\begin{aligned} T_1 - 2940 &= 300 \times 0.2 \\ T_1 &= 2940 + 300 \times 0.2 \\ T_1 &= 3000 \text{ N} \end{aligned}$$



- (b) Newton's 2nd Law, \downarrow

$$\begin{aligned} 2940 - T_2 &= 300 \times 0.05 \\ 2940 - 300 \times 0.05 &= T_2 \\ T_2 &= 2925 \text{ N} \end{aligned}$$

