

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

5 Newton's laws of motion

Exercise C, Question 4

Question:

A man, of mass 78 kg, stands in a lift of mass 200 kg that is accelerating upwards at 0.5 m s^{-2} . Calculate the magnitudes of the forces that act on the lift. Also draw a diagram to show how they act.

Solution:

Newton's 2nd Law \uparrow for man

$$R - 764.4 = 78 \times 0.5$$

$$\therefore R = 764.4 + 78 \times 0.5$$

$R = 803.4 \text{ N}$ is the normal reaction between the lift and the man.

Newton's 2nd Law, \uparrow , for lift $T - 1960 - R = 200 \times 0.5$

$$\therefore T = 1960 + 803.4 + 200 \times 0.5$$

$$T = 2863.4$$

$$T = 2860 \text{ N (3 s.f.)}$$

