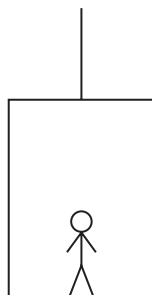Leave blank

3.

Figure 1

A lift of mass M kg is being raised by a vertical cable attached to the top of the lift. A person of mass m kg stands on the floor inside the lift, as shown in Figure 1. The lift ascends vertically with constant acceleration $1.4\,\text{m}\,\text{s}^{-2}$. The tension in the cable is $2800\,\text{N}$ and the person experiences a constant normal reaction of magnitude $560\,\text{N}$ from the floor of the lift. The cable is modelled as being light and inextensible, the person is modelled as a particle and air resistance is negligible.

(a) Write down an equation of motion for the person only.

(2)

(b) Write down an equation of motion for the lift only.

(2)

(c) Hence, or otherwise, find

    (i)   the value of m,

    (ii) the value of M.

(3)

Leave blank

Question 3 continued

Q3

(Total 7 marks)