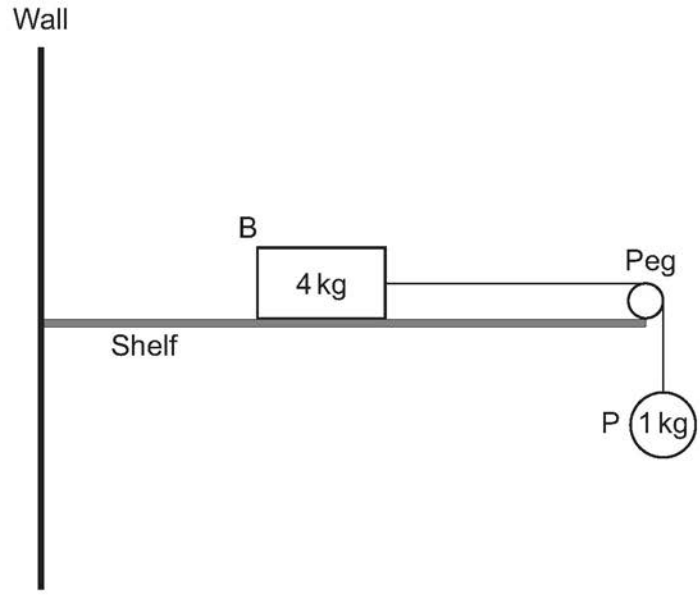
15 **In this question, use $g = 10\,\text{m s}^{-2}$**

A box, B, of mass 4 kg lies at rest on a fixed rough horizontal shelf.

One end of a light string is connected to B.

The string passes over a smooth peg, attached to the end of the shelf.

The other end of the string is connected to particle, P, of mass 1 kg, which hangs freely below the shelf as shown in the diagram below.



B is initially held at rest with the string taut.

B is then released.

B and P both move with constant acceleration $a\,\text{m s}^{-2}$

As B moves across the shelf it experiences a **total** resistance force of 5 N

15 (a) State one type of force that would be included in the total resistance force.

[1 mark]

15 (b) Show that $a = 1$

[4 marks]

15 (c) When B has moved forward exactly 20 cm the string breaks.

Find how much further B travels before coming to rest.

[4 marks]

15 (d) State one assumption **you** have made when finding your solutions in parts **(b)** or **(c)**.

[1 mark]