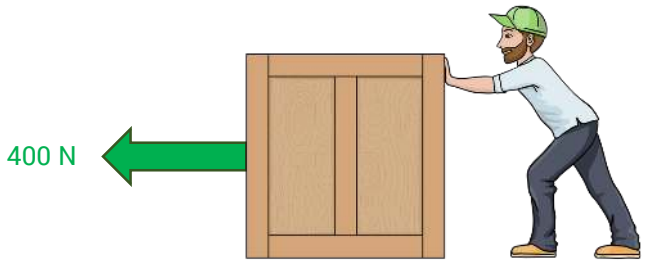
0 1

George is pushing the below box at a **constant speed** along a level surface. He applies a force of 400 N to the box.



0 1 . 1

State the value of the total frictional force acting on the box.
You may assume that the force of air resistance is negligible.

Frictional force = _____ N

[1 marks]

0 1 . 2

Calculate the amount of work George does against friction when he pushes the box through a distance of 50 cm.

Work done = _____ J

[3 marks]

0 1 . 3

As George pushes the box, the amount of chemical energy stored in his body decreases. Into which *object* (or objects), and into which *type of energy store*, is this energy transferred?

_____

_____

[2 marks]

0 1 . 4

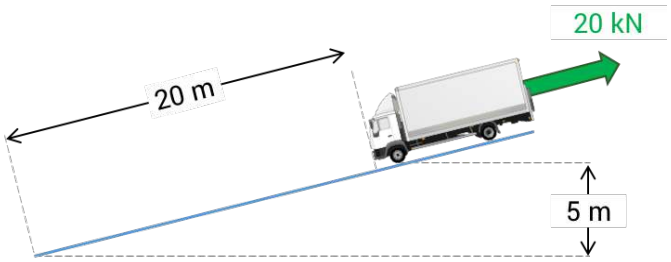
When taking a well-deserved break, George lifts a bottle of water which is sitting on the ground through a height of 1.5 m so that he can have a drink. In doing so, he does 7.35 J of work against gravity. Calculate the mass of the bottle. Take the value of g to be 9.8 N/kg.

Mass of bottle = _____ kg

[3 marks]

0 2

A lorry is travelling at a **steady speed** down a hill, as shown in the below diagram.



The total resistive force (from both friction and air resistance) acting on the lorry is 20 kN, and its mass is 10,000 kg.

0 2 . 1 Show that the lorry does 400 kJ of work against the resistive forces which are acting on it on this section of hill.

[2 marks]

0 2 . 2 Calculate the weight of the lorry. Take g = 9.8 N/kg.

Weight of lorry = _____ N

[2 marks]

0 2 . 3 Calculate the amount of work done on the lorry by gravity.
Write your answer in kilojoules.

Work done on lorry by gravity = _____ kJ

[2 marks]

0 2 . 4 Hence calculate the amount of energy which is transferred to the internal energy store of the brakes as the lorry travels down this section of hill.

Energy transferred to brakes = _____ kJ

[2 marks]