Forces, Work and Energy

Name ……………………

1. A cyclist accelerates from a set of traffic lights.

The driving force of the cyclist is 250 N forwards.

(a) How much work is done by this force when the cyclist travels 5 metres?
(Show your working.)

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Answer .... joules (J)

(2)

(b) What happens to the energy transferred by this force?

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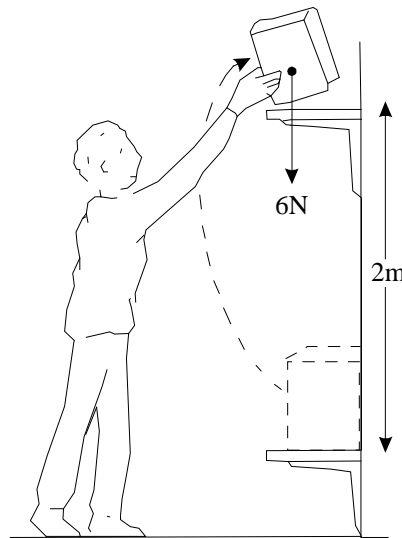...

(2)

(Total 4 marks)

2. A book weighs 6 newtons.

A librarian picks up the book from one shelf and puts it on a shelf 2 metres higher.

(a) Calculate the work done on the book. [Show your working].

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(3)

(b)   The next person to take the book from the shelf accidentally drops it.

The book accelerates at 9.8m/s².

Use this information to calculate the mass of the book. [Show your working].

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Answer .... kg.

(3)

(c)   If the book was dropped from an aeroplane high in the sky, it would accelerate to begin with. Eventually it would fall at a steady speed.

Explain in detail why this happens.

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(3)
(Total 9 marks)

3.   A car is stationary at red traffic lights on a long straight road. The lights turn green and the car accelerates. The car then travels at a constant speed of 30mph, then slows down and stops at another red traffic light.

(a) Sketch a speed-time graph for the motion described above.

(3)

(b) What does the area under the graph represent?

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(1)

(c) During the motion described above, the car transfers a total of 600kJ of chemical energy by burning petrol. At the end of the motion, when the car is stationary at the second set of traffic lights, where has all this energy gone?

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(2)
(Total 6 marks)