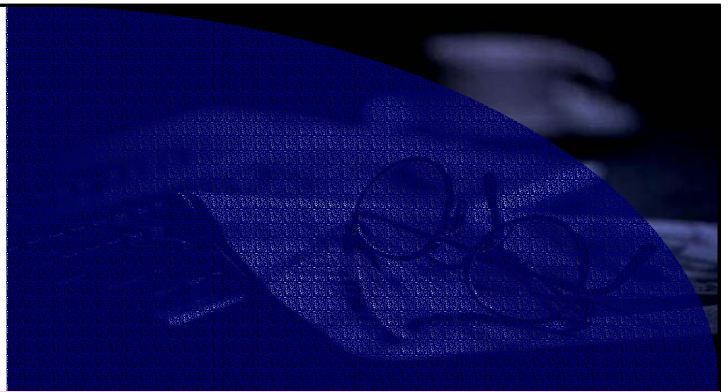


assessment for learning

year 9



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## 9I Energy and electricity

### Assessment for learning...year 9 (level 3-6)

Answer all questions:

Total marks	21
Time allowed	25 mins.

#### Question 1:

A bookshelf is 1 metre above the floor. As a book falls from the shelf to the floor it loses 7.5 J of **potential** energy.

(a) (i) Tick the box by the correct statement about the **kinetic** energy of the book.

While the book was resting on the shelf it had 7.5 J of kinetic energy.

While the book was falling, its potential energy was being transformed into kinetic energy.

While the book was falling, its kinetic energy remained constant.

While the book was falling, it lost kinetic energy.

1 mark

(ii) How much **kinetic** energy does the book have just before it hits the floor?

..... J

1 mark

(b) When the book hits the floor it stops and loses all its kinetic energy.

What happens to this energy?

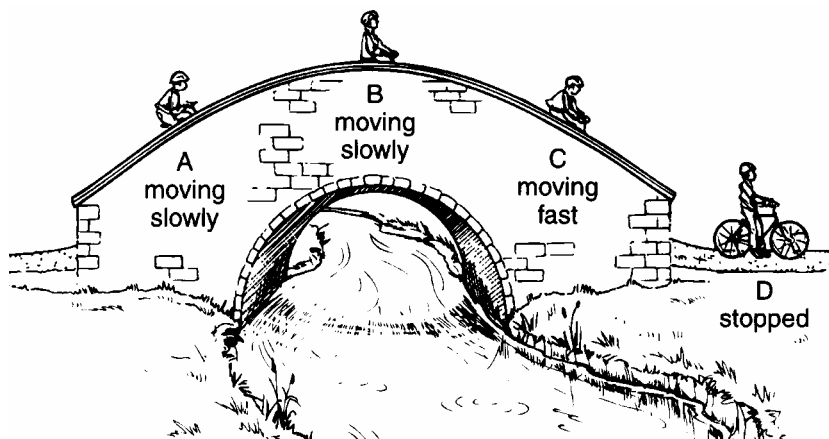
.....  
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1 mark

Maximum 3 marks

**Question 2:**

The diagram shows a cyclist at different positions as he cycles over a humpback bridge.



(a) (i) Where does the cyclist have the most kinetic energy?

Tick the correct box.

A       B       C       D

1 mark

(ii) Where does the cyclist have the most potential energy?

Tick the correct box.

A       B       C       D

1 mark

(iii) Where does the cyclist have the least potential energy?  
Tick the correct box.

A       B       C       D

1 mark

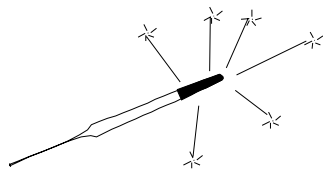
(b) The cyclist used some energy to cycle over the bridge. Where was this energy transferred to by the time the cyclist reached position **D**?

.....

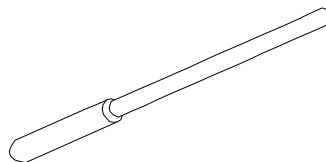
1 mark

Maximum 4 marks

**Question 3:**



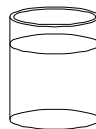
a tiny white hot spark from a sparkler



a heavy iron poker, hot enough to give out a dull red glow



a freshly boiled egg



a glass of cold water in a fridge

(a) Each of the four objects shown above started at room temperature. Now they are all at different temperatures, as described by the labels.

(i) Which object is at the highest temperature?

.....

1 mark

(ii) Which object has lost thermal energy?

.....

1 mark

(iii) Which object has had the largest gain in thermal energy?

.....

1 mark

(b) Omar puts a hot steel ball into a beaker of cold water. He waits until the temperatures of the ball and the water are the same.

From his results, he calculates that:

the thermal energy stored in the steel ball has fallen by 3770 J;  
the thermal energy stored in the water has risen by 2940 J.

The energy stored in the water rose by less than 3770 J. What has happened to the other 830 J?

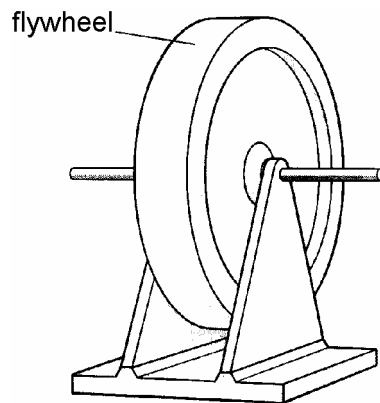
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1 mark

Maximum 4 marks

**Question 4:**

A flywheel is a rotating wheel which is used to store energy.



(a) Energy must be transferred to a flywheel to make it rotate. How is the energy in the rotating flywheel classified?  
Tick the correct box.

as chemical energy

as kinetic energy

as potential energy

as thermal energy

1 mark

(b) A flywheel is rotating at a high speed. No energy is being supplied to it. The flywheel is used to turn a dynamo, and the energy from the dynamo is used to light a bulb.

(i) The bulb is left connected until the flywheel stops rotating. Not all the energy stored in the flywheel is transferred to the bulb. Some of it is lost. Give **two** places from which it is lost, and explain how it is lost.

1. ....

.....

2. ....

.....

2 marks

(ii) The experiment is repeated using a different bulb which gives out more energy each second. Compared to the first light bulb, describe how the second light bulb will affect the motion of the flywheel, and explain your answer.

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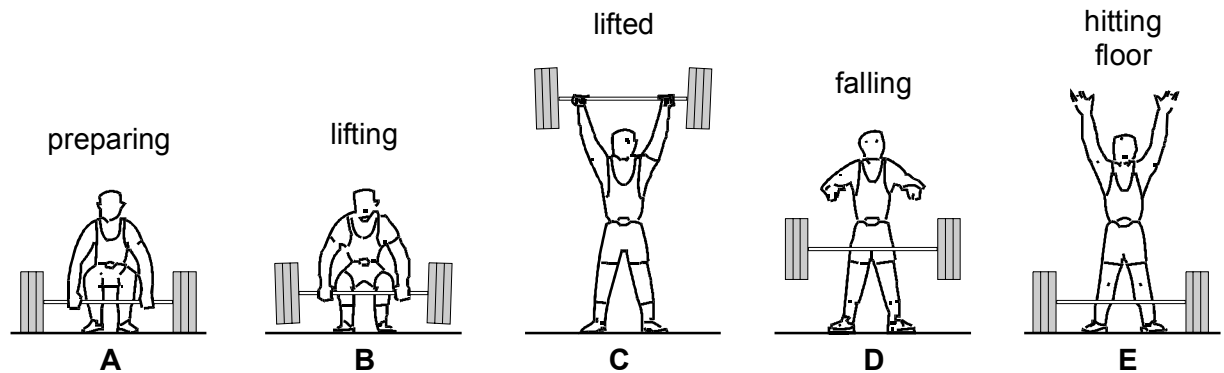
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2 marks

Maximum 5 marks

**Question 5:**

The drawings show a weightlifter. The stages in weightlifting are labelled A, B, C, D and E.



(a) (i) Complete the sentences below.

As the weights were lifted up, energy was transferred from the man to the weights. This energy had been stored as ..... energy in the ..... of the man's arms.

2 marks

(ii) How was energy stored in the weights at stage C?

Tick the correct box.

as chemical energy

as elastic energy

as kinetic energy

as gravitational potential energy

1 mark

(b) Complete the sentences below.

(i) In stage D, as the weights were falling, the energy was transferred from ..... energy to ..... energy.

1 mark

(ii) In stage E, as the weights hit the floor, the energy was transferred from ..... energy to ..... energy.

1 mark

Maximum 5 marks