

1

(a) A torch battery is an energy resource. How is the energy stored in a torch battery?  
Tick the correct box.

- as chemical energy
- as kinetic energy
- as potential energy
- as thermal energy

1 mark

(b) When a torch is switched on, energy is transferred from the battery to the bulb.  
How is energy transferred from the battery to the bulb?  
Tick the correct box.

- by electricity
- by light
- by sound
- by thermal energy

1 mark

(c) Energy is transferred from the torch bulb to the surroundings.

Choose from the following terms to complete the sentences.

**electricity      light      sound      thermal transfer**

(i) Energy is transferred from the torch bulb to the surroundings in a  
**useful** way by .....

1 mark

(ii) Some energy is wasted. The wasted energy is transferred from the  
bulb to the surroundings by .....

1 mark

(d) The torch is lifted up and put on a high shelf.



Energy is transferred to the torch as it is lifted up. The energy is stored in the torch while it stays on the shelf.

What energy has the torch gained?

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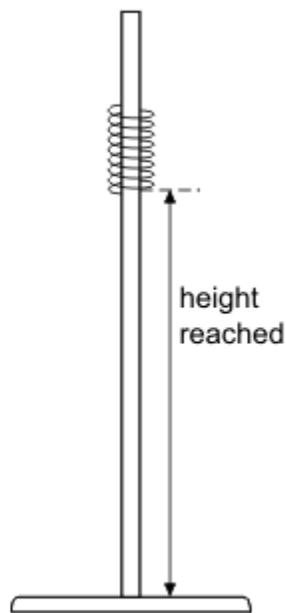
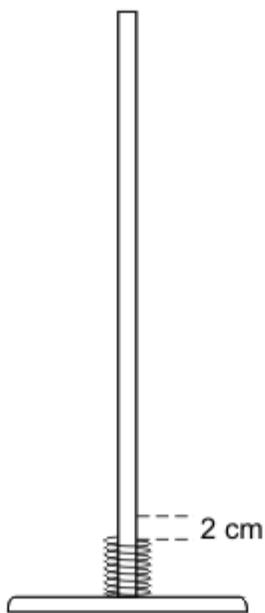
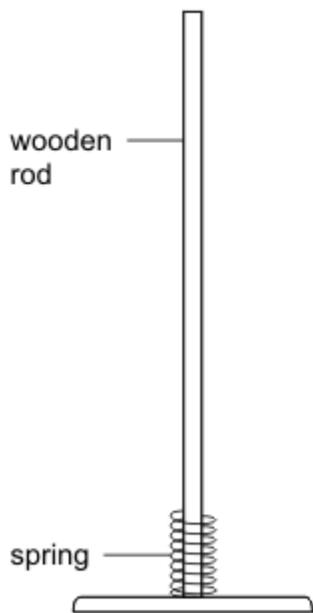
1 mark  
Maximum 5 marks

2

Jenny put a spring over a wooden rod.

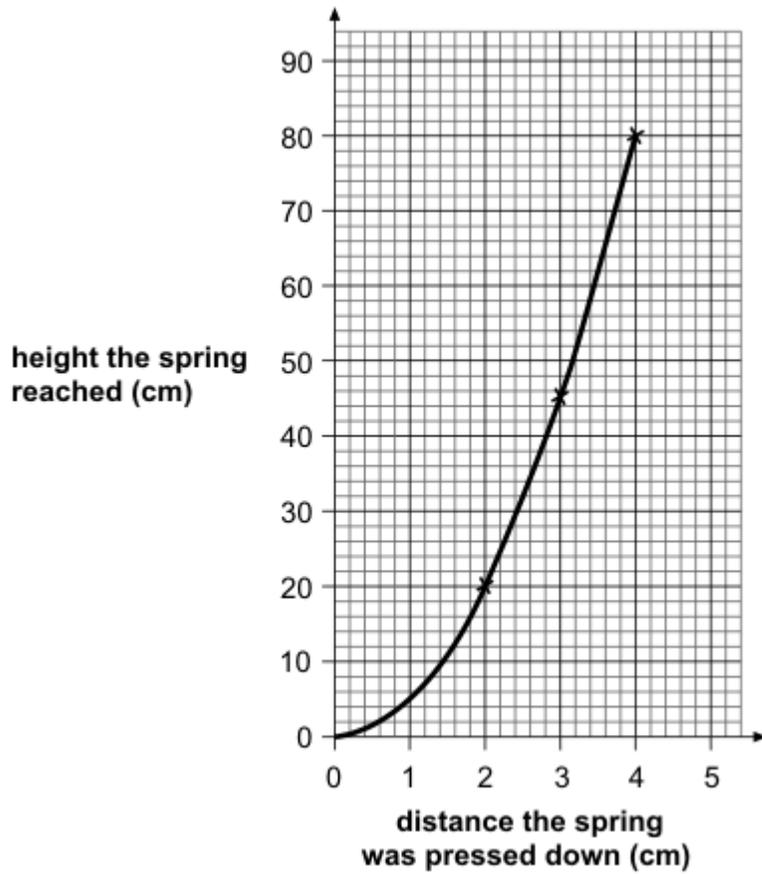
She pressed the spring down 2 cm.

She let go of the spring and measured the height it reached.



*not to scale*

Jenny repeated her experiment. She pressed the spring down more each time. Her results are shown in the graph below.



(a) Use Jenny's graph to complete the table below.

distance the spring was pressed down (cm)	height the spring reached (cm)
2	
3	
4	

1 mark

(b) Jenny said, 'If I double the distance I press the spring down, the height it reaches will also double'.

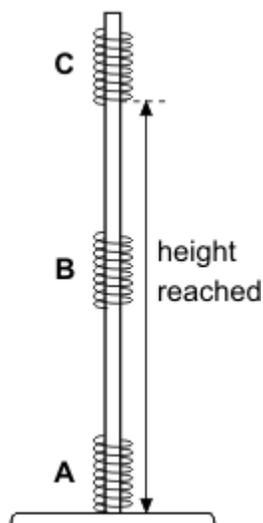
How do the results show she was wrong?

.....

.....

1 mark

(c) This diagram shows the moving spring in three different positions.



Complete the sentences below by choosing words from the box. You can use each word more than once.

<b>most</b>	<b>some</b>	<b>least</b>
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(i) When the spring is moving at **B** it has kinetic energy and ..... gravitational potential energy.

1 mark

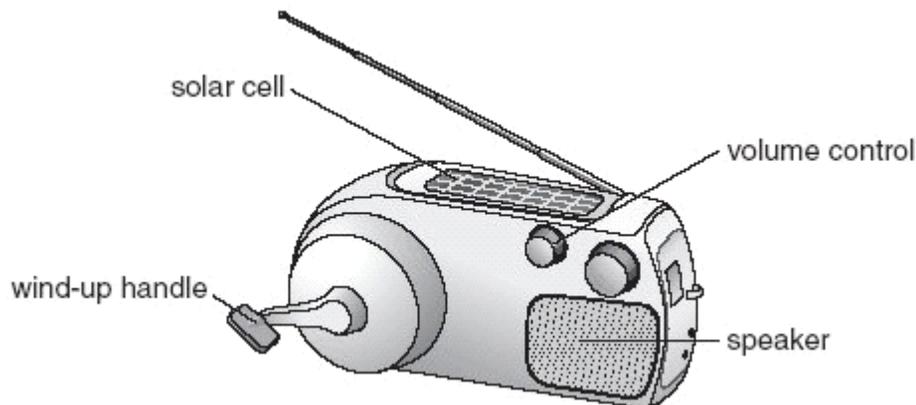
(ii) When the spring reaches **C** it has ..... gravitational potential energy and ..... kinetic energy.

1 mark

(iii) When the spring stops at **A** it has ..... kinetic energy and ..... gravitational potential energy.

1 mark  
maximum 5 marks

**3** Keith has a wind-up radio. It does **not** use batteries. It is powered by a steel spring.



- (a) Keith winds up the spring.  
As the spring unwinds, potential energy in the spring is transferred to a generator, which then turns.

The generator provides electrical energy for the radio.

Fill the gaps in the sentences below to show the useful energy changes which take place in the generator and the speaker.

- (i) As the generator turns, ..... energy is  
changed to electrical energy.

1 mark

- (ii) In the speaker, electrical energy is changed to  
..... energy.

1 mark

- (b) When Keith turns the volume up so that the radio is louder, the spring unwinds more quickly.

Why does the spring unwind more quickly?

.....  
.....

1 mark

- (c) The radio has a solar cell which can also provide electrical energy.

Keith winds up his radio and takes it outside without changing the volume. The steel spring unwinds more slowly when sunlight falls on the solar cell. Explain why.

.....  
.....

1 mark

- (d) The wind-up radio was designed for use in poorer countries.

Suggest why wind-up radios are useful in poorer countries.

.....  
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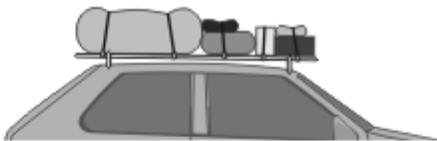
1 mark  
maximum 5 marks

4

(a) The pictures show four objects. Each object has had its shape changed.



Bent metal ruler  
**A**



Stretched bungee cords  
**B**



Springs on a playground ride  
**C**



Moulded plastic model car body  
**D**

Which of the objects are storing elastic potential energy?

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Explain the reason for your choice or choices.

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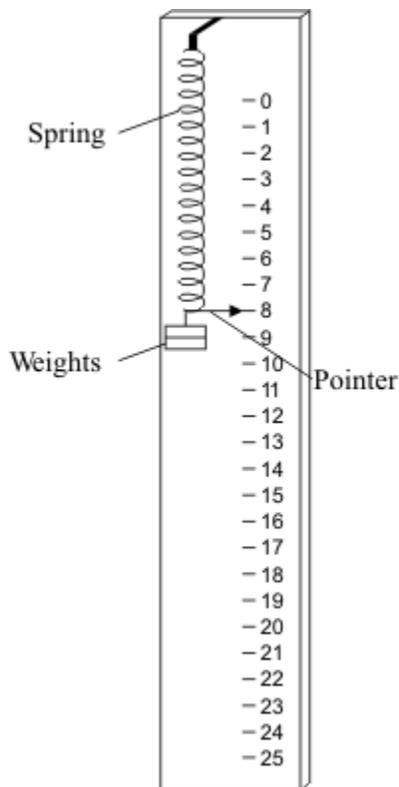
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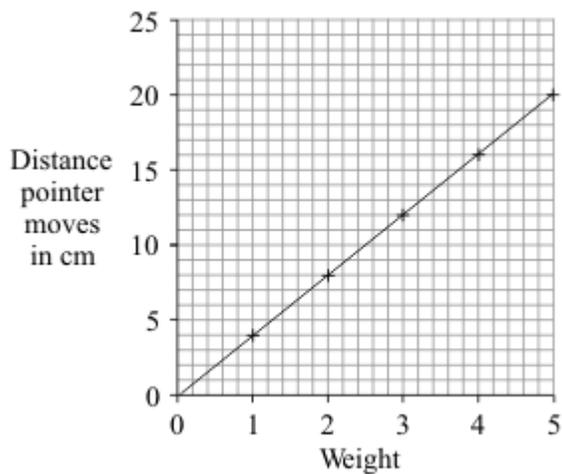
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(3)

- (b) A student makes a simple spring balance. To make a scale, the student uses a range of weights. Each weight is put onto the spring and the position of the pointer marked



The graph below shows how increasing the weight made the pointer move further.



- (i) Which **one** of the following is the unit of weight?.

Draw a ring around your answer.

**joule      kilogram      newton      watt**

(1)

- (ii) What range of weights did the student use?

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(1)

(iii) How far does the pointer move when 4 units of weight are on the spring?

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**(1)**

(iv) The student ties a stone to the spring. The spring stretches 10 cm.

What is the weight of the stone?

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**(1)**

**(Total 7 marks)**