

# Energy and electricity/gravity and space

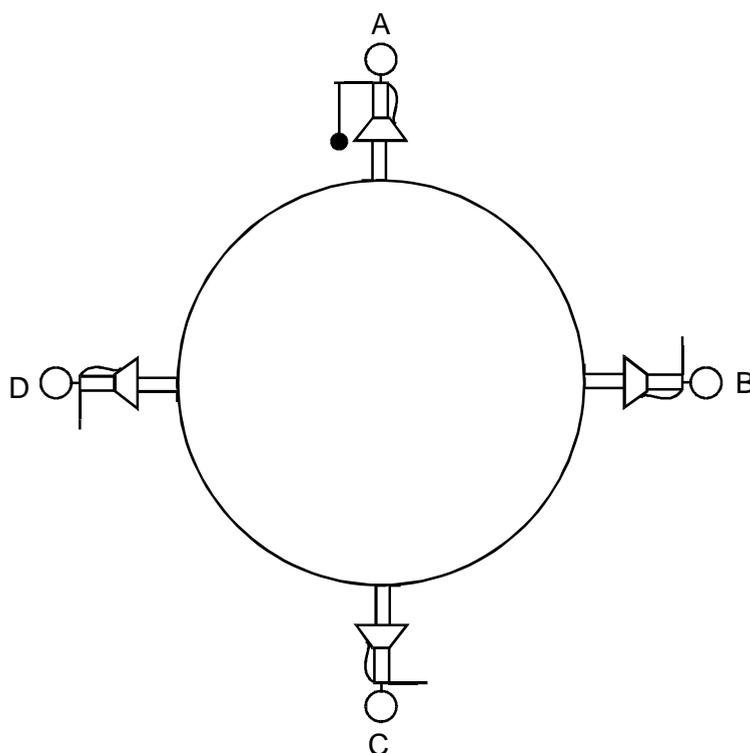
9I & 9J

29 min

31 marks

Q1-L4, Q2-L4, Q3-L5, Q4-L6, Q5-L6

1. Lisa drew a picture of herself standing at four different positions on the Earth,



*not to scale*

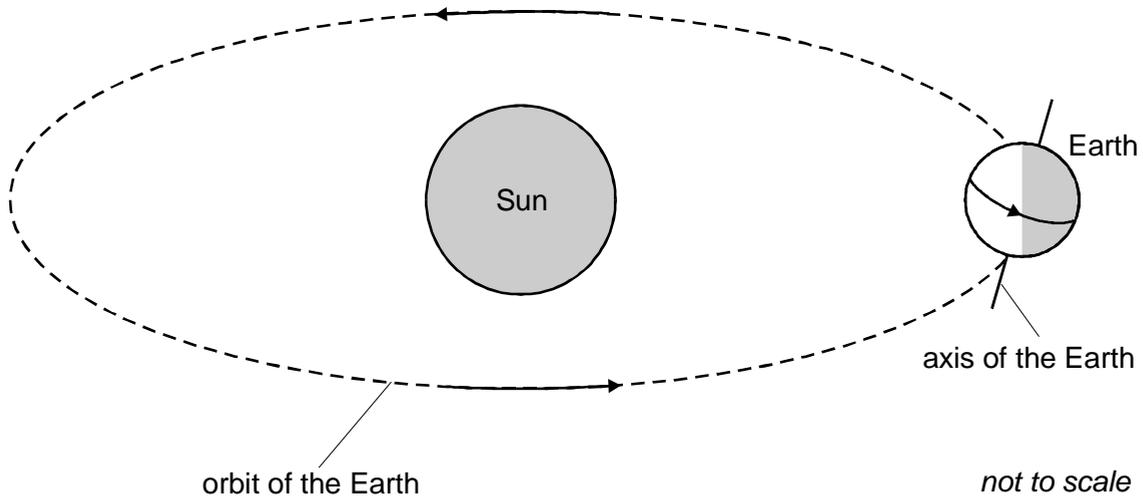
- (a) (i) Draw an arrow at **each** of the four positions to show the direction of the force of gravity on Lisa.
- (ii) The drawing at position A shows Lisa holding a ball on a string. Draw the ball and string in positions B, C and D.

1 mark

1 mark

(b) The drawing below shows:

- that the Earth goes round the Sun;
- that the Earth rotates on its axis.



Choose from the list below to answer parts (i) and (ii).

**60 seconds 60 minutes 24 hours 7 days 28 days 365 days**

(i) How long does it take for the Earth to go round the Sun once?

.....

1 mark

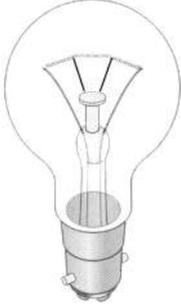
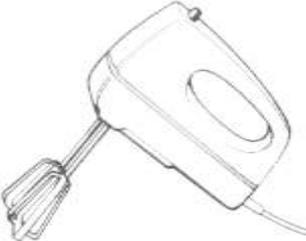
(ii) How long does it take for the Earth to rotate on its axis once?

.....

1 mark

Maximum 4 marks

2. The drawings below show what happens to the energy supplied to four appliances.

kettle		<p><b>98%</b> of the energy is used to heat the water</p>	<p><b>2%</b> of the energy is wasted</p>
light bulb		<p>_____ % of the energy is given out as light</p>	<p><b>95%</b> of the energy is wasted</p>
radio		<p><b>50%</b> of the energy is given out as sound</p>	<p><b>50%</b> of the energy is wasted</p>
mixer		<p><b>40%</b> of the energy is used to move the whisks</p>	<p>_____ % of the energy is wasted</p>

(a) (i) What percentage of energy of the light bulb is given out as light?  
Write your answer on the line by the light bulb.

1 mark

(ii) What percentage of energy is wasted by the mixer?  
Write your answer in the box by the mixer.

1 mark

(iii) Complete the sentence below.

Parts of the mixer become hot because some of the electrical energy is changed into ..... energy which is wasted.

1 mark

(b) Energy is wasted as sound in many appliances.  
Which appliance in the drawings produces sound which is **not** wasted?

.....

1 mark

(c) In which of the appliances is the highest percentage of energy wasted?

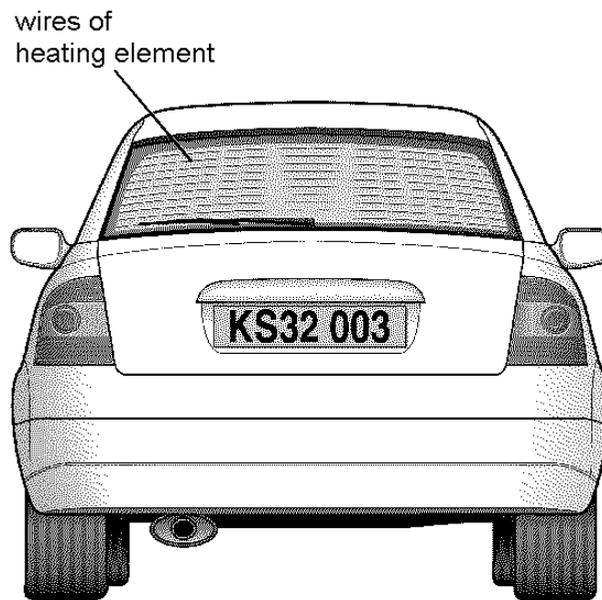
.....

1 mark

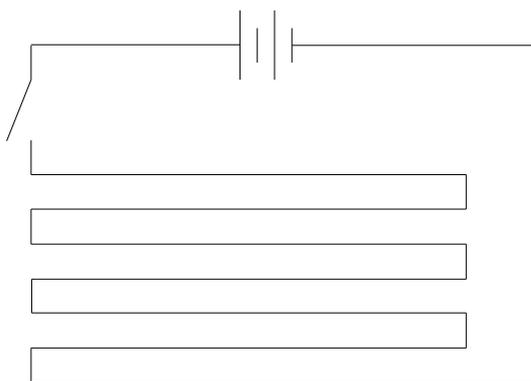
Maximum 5 marks

3. The back window of this car contains a heating element.

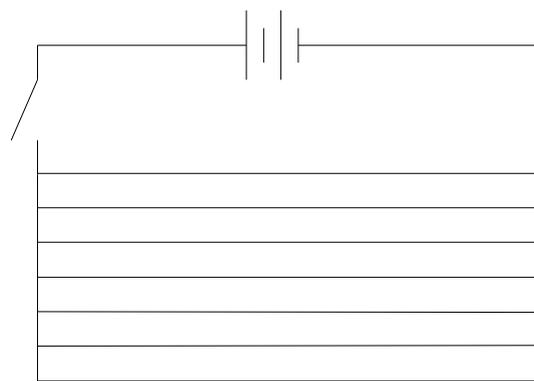
The heating element is part of an electrical circuit connected to the battery of the car.



The diagrams below show **two** ways of connecting the circuit of a heating element.



**circuit A**



**circuit B**

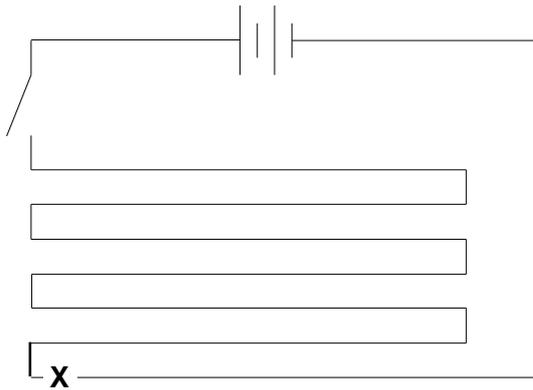
(a) Give the name of each type of circuit:

circuit A .....

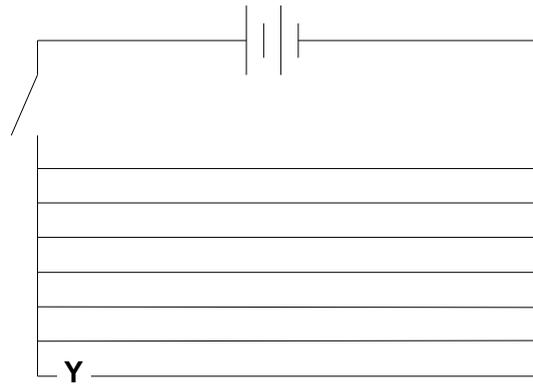
circuit B .....

1 mark

(b) A wire gets broken at point X on circuit A and at point Y on circuit B.



**circuit A**



**circuit B**

When the switch is closed, how does the broken wire affect the heating element in:

(i) circuit A? .....

.....

1 mark

(ii) circuit B? .....

.....

1 mark

(c) In very cold weather, ice may form on the back window of the car. When the heating element is switched on, the ice will disappear and the surface of the window will become clear and dry.

(i) Fill the gap below to show the energy transfer that takes place.

When the heater is switched on, ..... energy is transferred from the wires to the ice.

1 mark

(ii) As the window becomes clear and dry, physical changes take place in the ice.

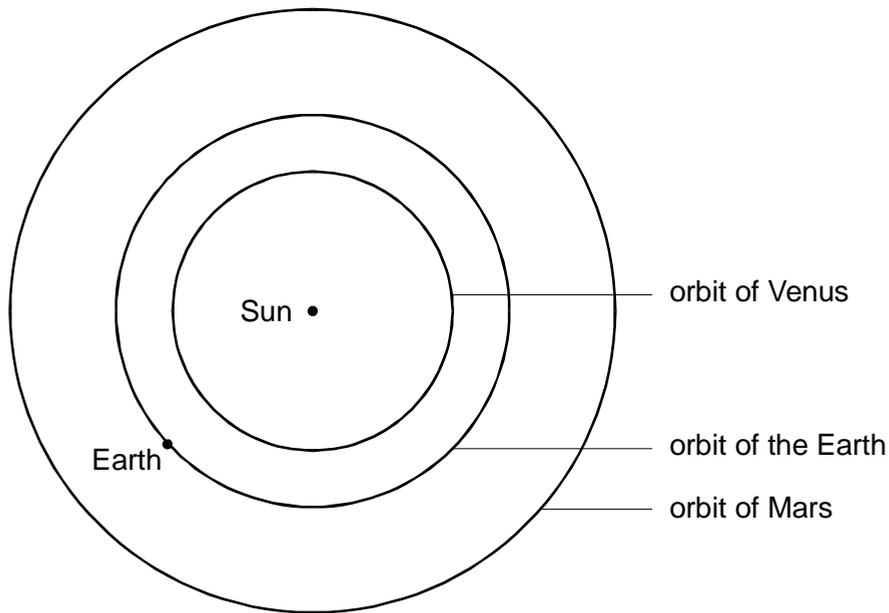
Fill the gaps below to show the physical changes which take place.

from ..... to ..... to .....

1 mark

Maximum 5 marks

4. The diagram shows the orbits of the Earth, Mars and Venus. The position of the Earth is shown.



*not to scale*

A person on the Earth observes Mars and Venus.

- (a) (i) On the diagram above, draw **two** more dots to show the positions of Mars and Venus when they are closest to the Earth.

Label the dot for Mars with a letter M and the dot for Venus with a letter V.

1 mark

- (ii) Why is it easiest to see Mars when it is closest to the Earth?

.....  
 .....

1 mark

- (b) What force keeps the Earth in its orbit and stops it flying off into space?

.....

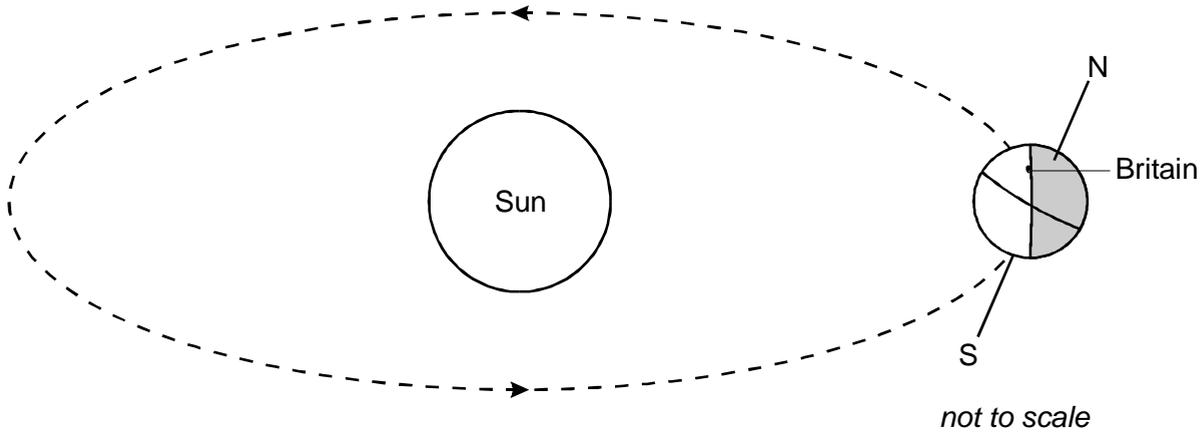
1 mark

- (c) From the Earth, the Moon always looks approximately the same size. What can you conclude from this about the orbit of the Moon around the Earth?

.....  
 .....

1 mark

(d) The diagram shows the Earth in its orbit around the Sun.



What season is it in Britain? Explain your answer.

.....

.....

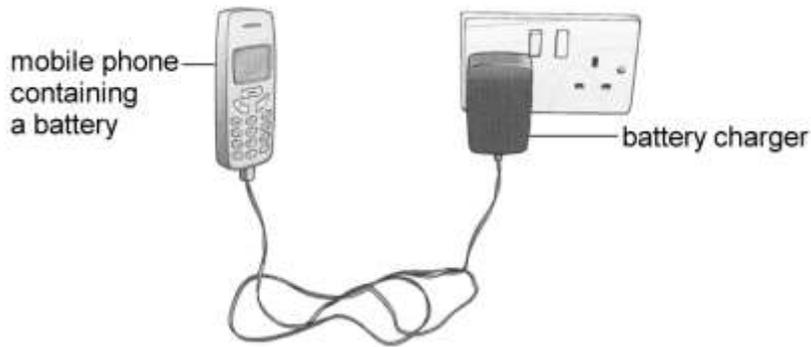
.....

.....

2 marks

Maximum 6 marks

5. (a) Jacque has a mobile phone. Energy is stored in the battery of the phone. The drawing shows the battery being charged.



(i) Which energy transfer takes place in the battery as it is being charged? Tick the correct box.

chemical to sound

sound to thermal

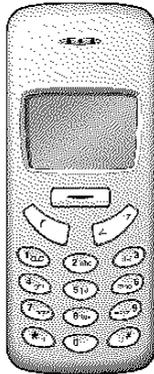
electrical to chemical

thermal to electrical

1 mark

(ii) When the battery is fully charged, Jacquie unplugs the phone.

Which energy transfers take place when the mobile phone rings?  
Tick the correct box.



chemical to electrical to sound

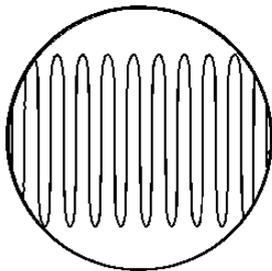
electrical to chemical to sound

kinetic to electrical to sound

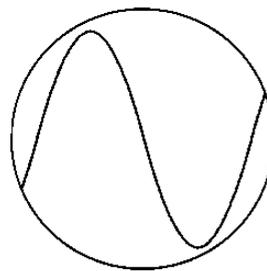
thermal to electrical to sound

1 mark

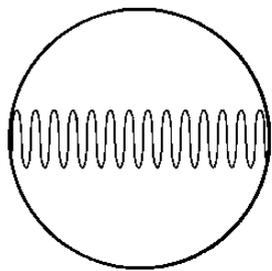
(b) Jacquie can change the ring-tone of her phone.  
The diagrams below show the patterns made by four sound waves on an oscilloscope screen.  
They are all drawn to the same scale.



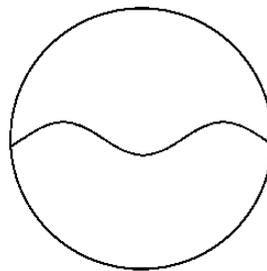
P



Q



R



S

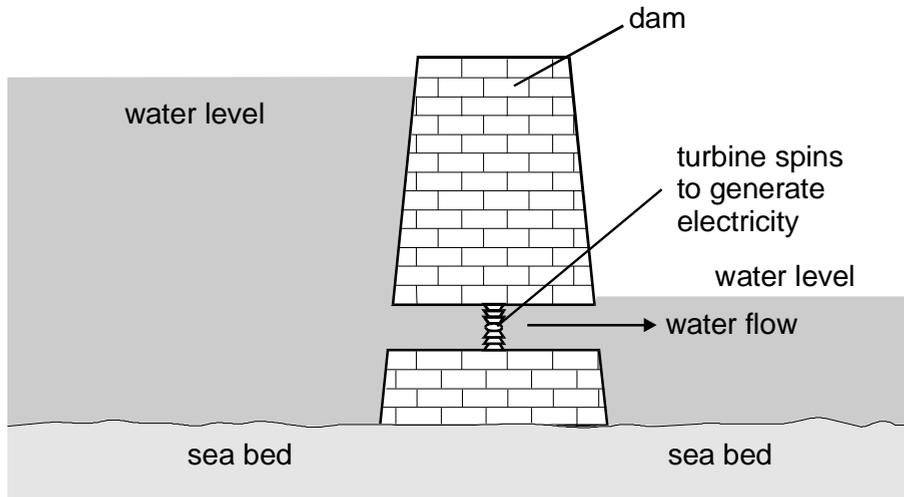
Write the letter of the sound wave that matches each of the descriptions below.

- (i) a loud sound with a low pitch .....
- (ii) a quiet sound with a high pitch .....
- (iii) a loud sound with a high pitch .....

3 marks

Maximum 5 marks

6. The tides can be used to generate electricity. A dam is built across a river estuary, as shown below.



- (a) The water is higher on one side of the dam than on the other. As the water begins to flow through the dam it turns a turbine. The turbine generates electricity. Describe the useful energy changes which take place in this process.

.....  
.....  
.....  
.....

2 marks

- (b) Explain why tides are classified as a renewable energy source.

.....  
.....

1 mark

(c) Give **one** way, **other** than from the tides, of generating electricity by using the sea.

.....

1 mark

(d) Apart from cost, give **one** advantage and **one** disadvantage of an oil-fired power station compared with a tidal power station.

advantage .....

.....

disadvantage .....

.....

2 marks

Maximum 6 marks