

Surname \_\_\_\_\_

Other Names \_\_\_\_\_

Centre Number \_\_\_\_\_

For Examiner's Use

Candidate Number \_\_\_\_\_

Candidate Signature \_\_\_\_\_

## ASSESSMENT AND QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Foundation Tier

June 2010

### Physics

Unit Physics P3

Written Paper

**PHY3F**

Friday 28 May 2010 9.00 am

For this paper you must have:

- a ruler.

You may use a calculator.

#### TIME ALLOWED

- 45 minutes plus your additional time allowance.

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

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## **INSTRUCTIONS**

- **Use black ink or black ball-point pen.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided.**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**

## **INFORMATION**

- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 45.**
- **You are expected to use a calculator where appropriate.**
- **You are reminded of the need for good English and clear presentation in your answers.**

## **ADVICE**

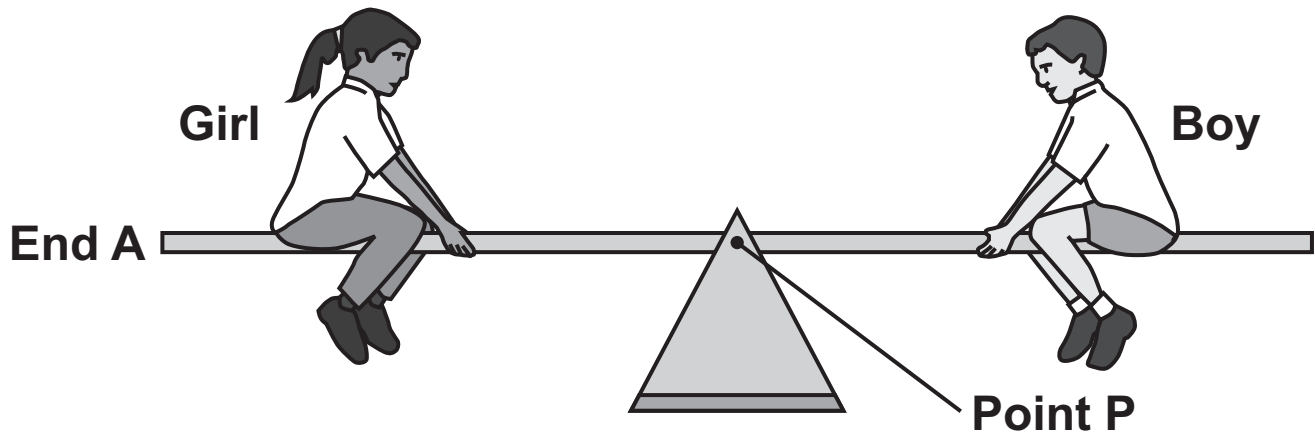
- **In all calculations, show clearly how you work out your answer.**

**DO NOT TURN OVER UNTIL TOLD TO DO SO**

Answer ALL questions in the spaces provided.

1 Two children visit a playground.

1 (a) The diagram shows them on a see-saw.  
The see-saw is balanced.



Complete the following sentences by drawing a ring around the correct word or line in the box. [1 mark + 1 mark + 1 mark]

1 (a) (i) The turning effect of the girl's weight is called

	force.
her	load.
	moment.

1 (a) (ii) Point P is the axis of  
see-saw.

balance	of the
rotation	
turning	

1 (a) (iii) To make end A of the see-saw go up,

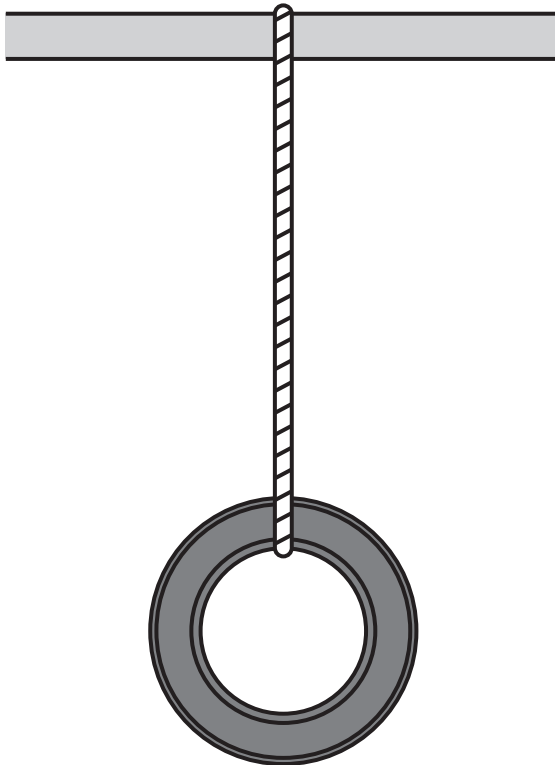
the boy moves nearer to point P.

the girl moves nearer to point P.

the girl moves nearer to end A.

1 (b) In another part of the playground, a tyre has been suspended from a bar.

1 (b) (i) Draw an X on the diagram so that the centre of the X marks the centre of mass of the tyre.  
[1 mark]



[Question 1 continues on the next page]

1 (b) (ii) Complete the sentence by using the correct word or phrase from the list. [1 mark]

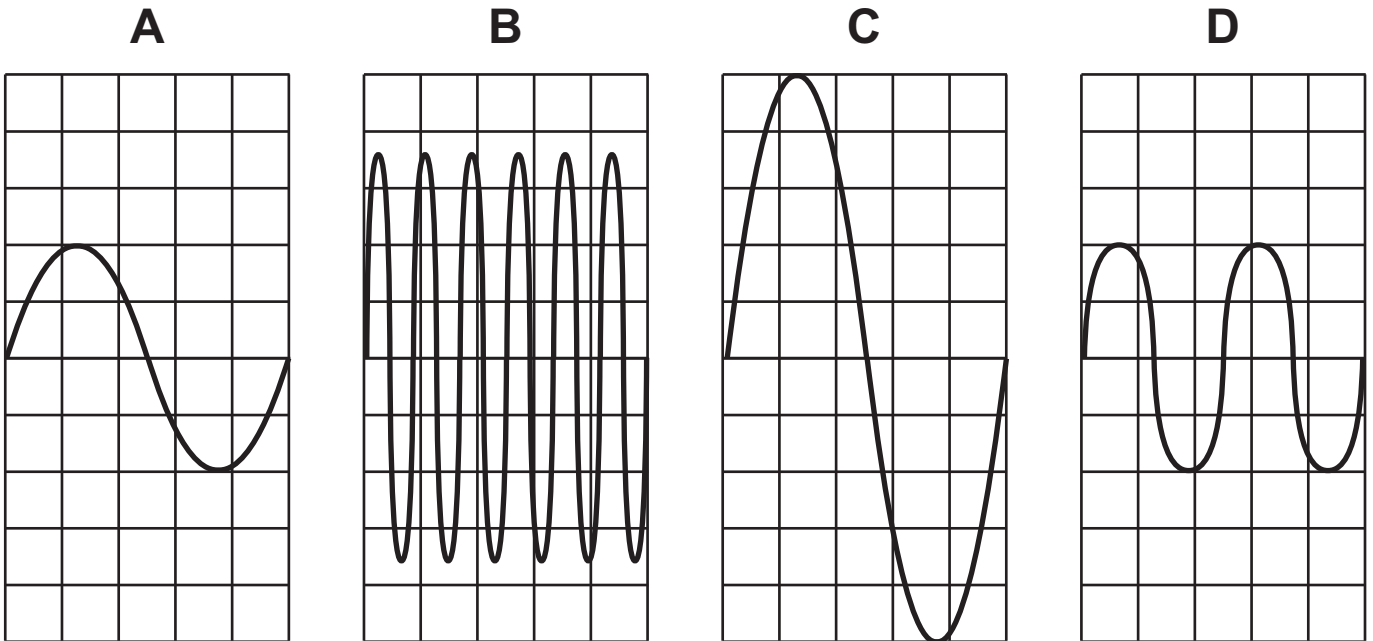
above                      below                      to the left of  
  
to the right of

If the suspended tyre is pushed, it will come to rest with its centre of mass directly

\_\_\_\_\_ the point of suspension.

**2(a) (i) A sound wave can be represented as a wave on the screen of an oscilloscope.**

**The diagrams A, B, C and D show different screens for the same settings of an oscilloscope.**



**Which diagram represents the sound with the highest frequency? [1 mark]**

**Diagram**

**[Question 2 continues on the next page]**

**2 (a) (ii) Complete the sentences using the correct name from the list. [1 mark]**

**a loudspeaker                      a microphone**

**an ultrasound transmitter**

**Information is transferred from a sound wave to an oscilloscope by**

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**2 (b) Complete the sentences by drawing a ring around the correct word in the box. [1 mark + 1 mark]**

**2 (b) (i) The pitch of a note increases as the**

**amplitude**

**frequency**

**wavelength**

**increases.**

**2 (b) (ii) The loudness of a note decreases as the**

**amplitude**

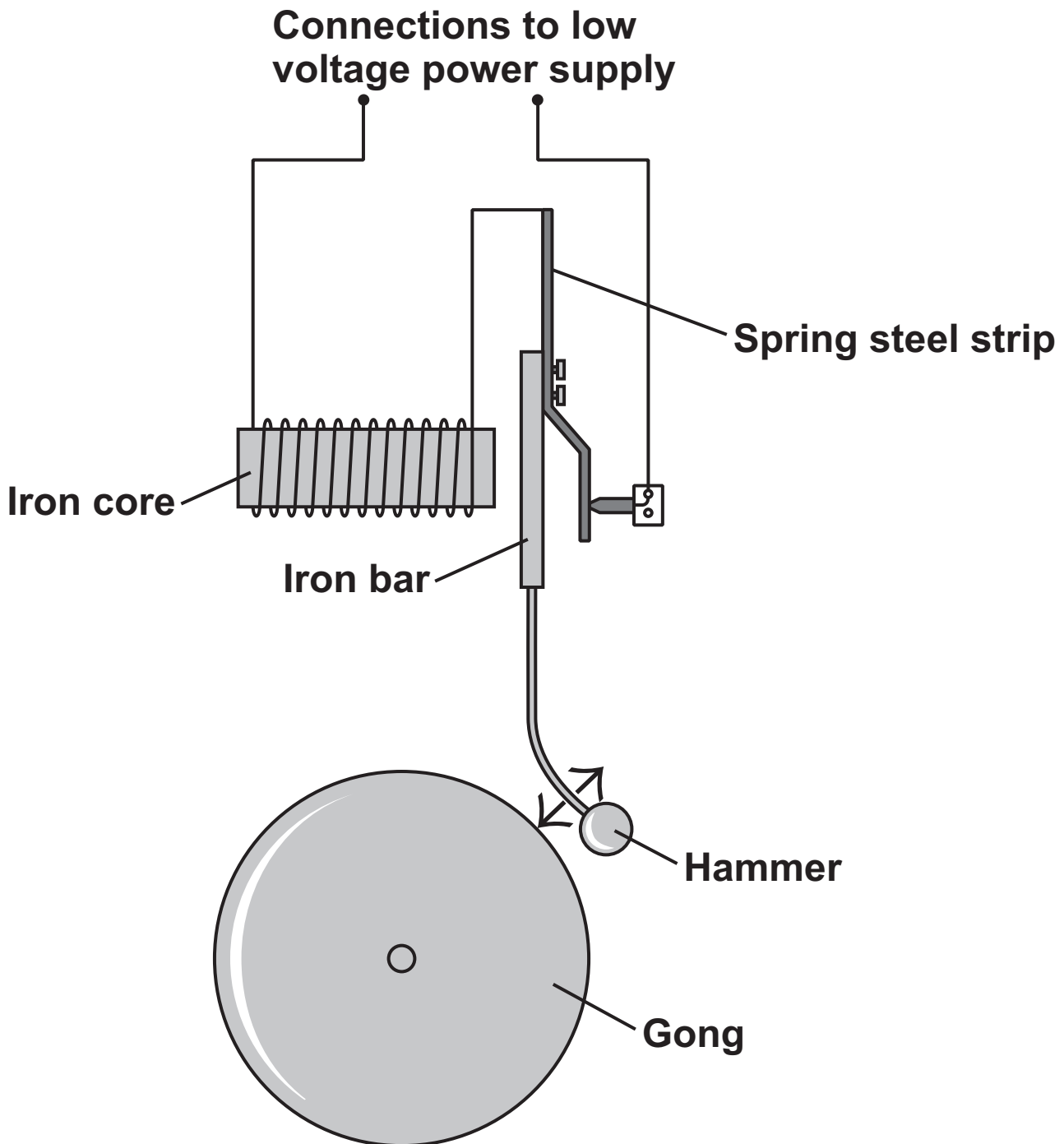
**frequency**

**wavelength**

**decreases.**



- 2(c) The diagram shows part of the inside of an electric bell.

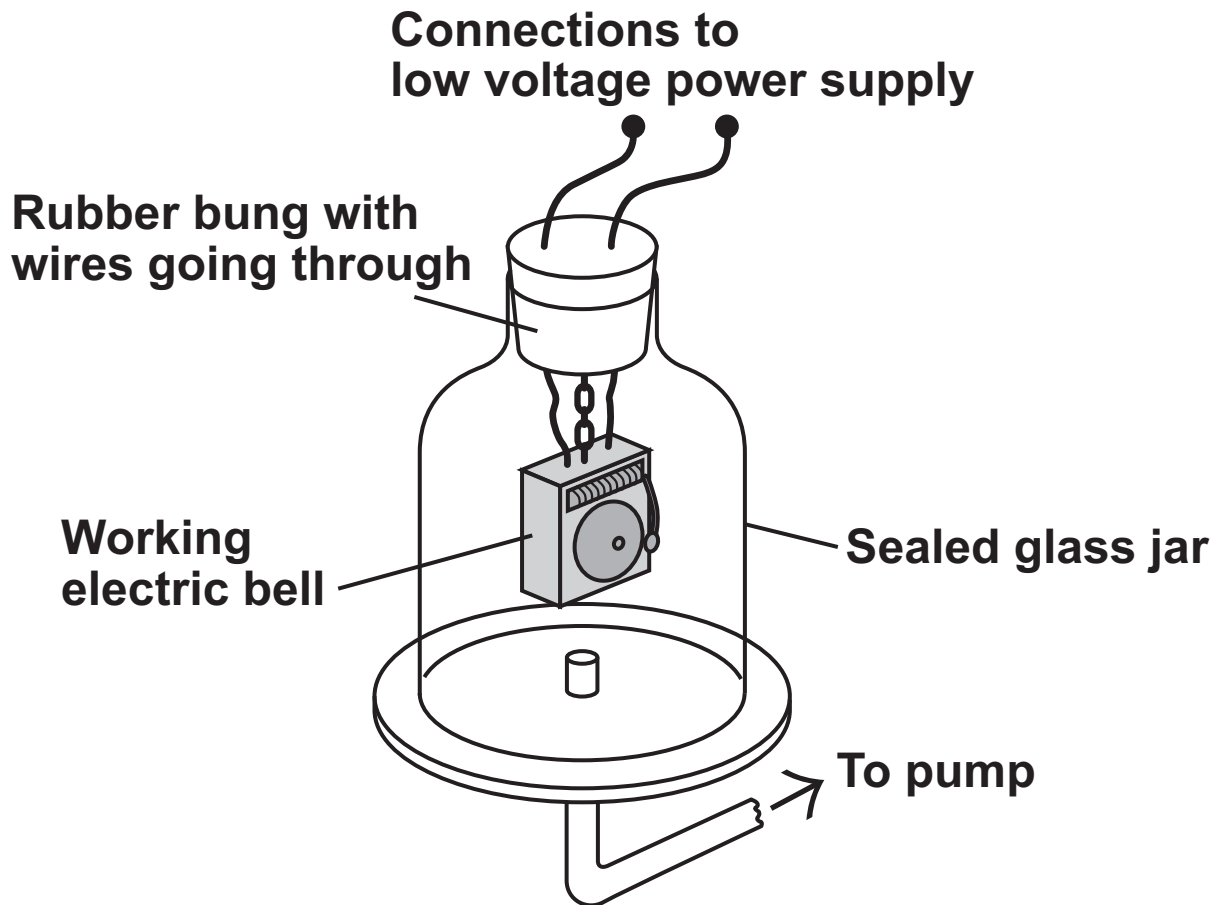


Name the part of the bell which contains the iron core and attracts the iron bar. [1 mark]

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[Question 2 continues on the next page]

- 2 (d) A group of students use a pump to remove all the air from around a working electric bell in a sealed glass jar.



- 2 (d) (i) What will happen to the sound which they hear from the bell after all the air is removed from the sealed glass jar? [1 mark]

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- 2 (d) (ii) Explain your answer to part (d)(i). [1 mark]

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**3 The hammer throw is an athletic event.**

**The athlete throws a heavy metal ball attached by a wire to a handle.**



**3 (a) The hammer thrower swings the hammer round in a circle before letting go.**

**He swings the hammer slowly at first and then faster.**

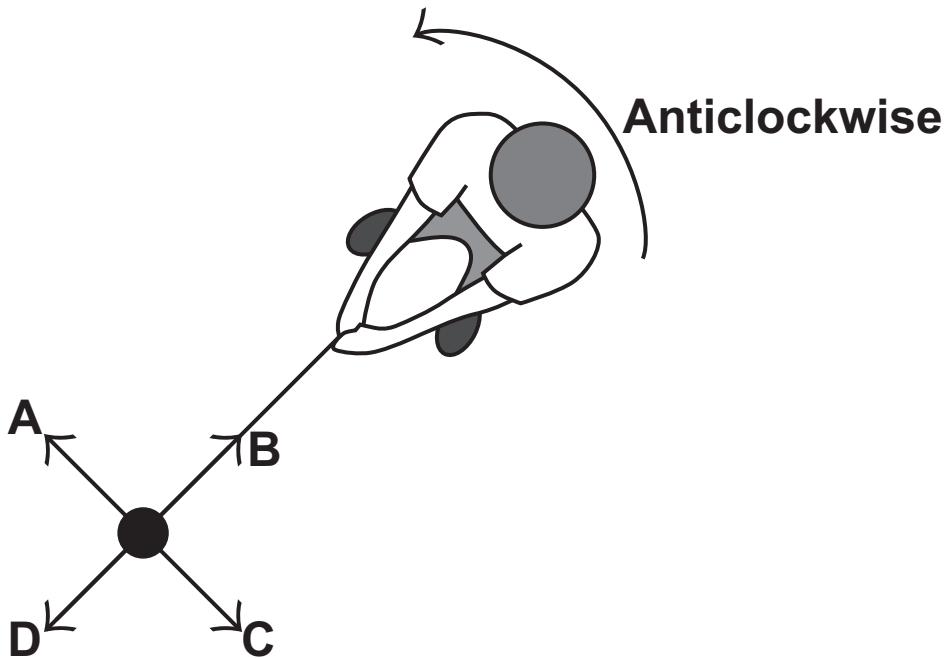
**Complete the following sentence by drawing a ring around the correct word or line in the box. [1 mark]**

**As the speed of the swing increases, the centripetal force on the**

	<b>decreases.</b>
<b>hammer</b>	<b>does not change.</b>
	<b>increases.</b>

**[Question 3 continues on the next page]**

- 3 (b) The diagram shows an overhead view of a hammer thrower swinging the hammer anticlockwise in a circle.



- 3 (b) (i) In which direction, A, B, C or D, does the centripetal force act on the hammer? [1 mark]

- 3 (b) (ii) Complete the following sentence by drawing a ring around the correct line in the box. [1 mark]

The centripetal force is provided by the

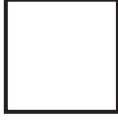
air resistance.

gravitational force.

tension in the wire.

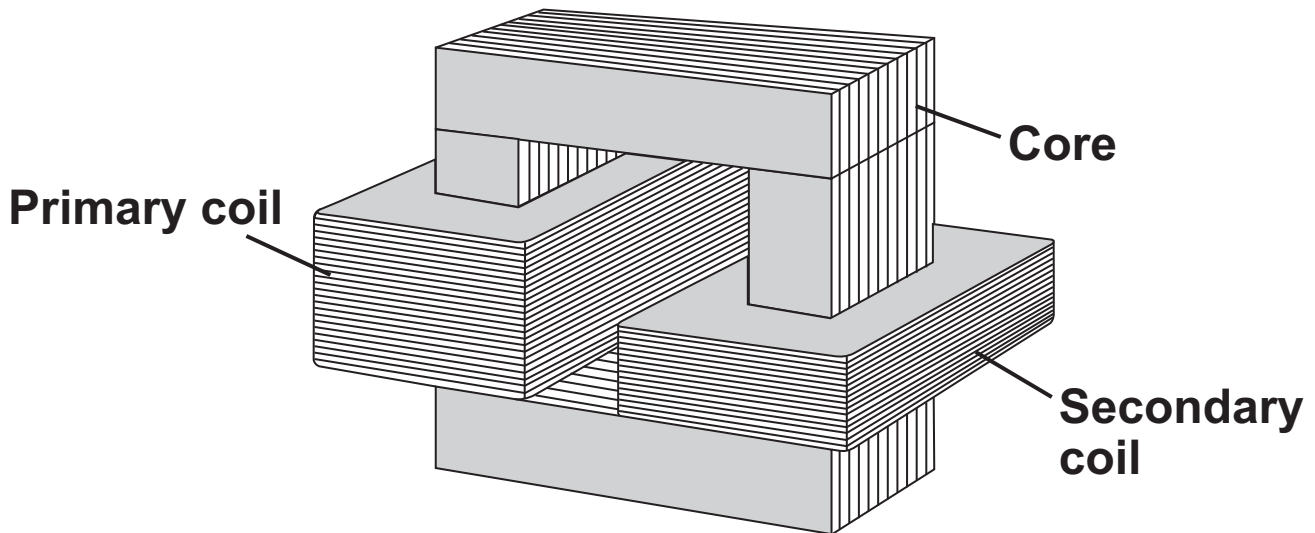
**3 (b) (iii) At the instant shown in the diagram above, the athlete lets go of the handle.**

**In which direction, A, B, C or D, does the hammer move? [1 mark]**



**[Turn over for the next question]**

4 A teacher demonstrates a small transformer.



4 (a) (i) What is the core made of? [1 mark]

Draw a ring around the correct word in the list.

aluminium

copper

iron

4 (a) (ii) The potential difference (p.d.) across the secondary coil is less than the p.d. across the primary coil.

What sort of transformer is it? [1 mark]

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4 (b) Where is a step-up transformer used as part of the National Grid? [1 mark]

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4 (c) The teacher writes a note about the transformer but leaves FIVE spaces.

Use the correct words from the list to complete the spaces. [5 marks]

coil            core            current            ends  
field            wire

A transformer works because an alternating

\_\_\_\_\_ in the primary

\_\_\_\_\_ produces a

changing magnetic \_\_\_\_\_

in the \_\_\_\_\_ and then

in the secondary coil.

This induces an alternating potential difference across the

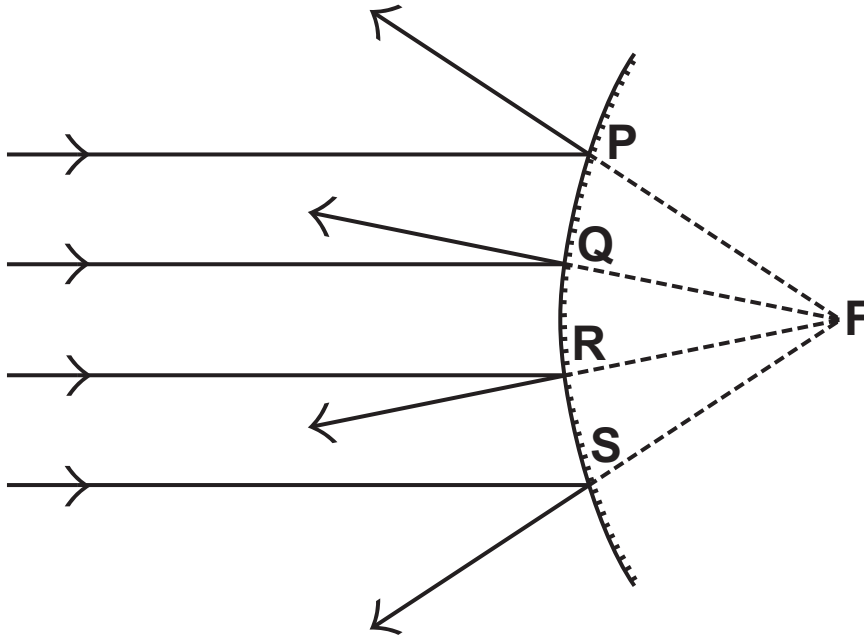
\_\_\_\_\_ of the secondary

coil.

[Turn over for the next question]

**5 (a)** A student uses a ray box and a curved mirror.

The diagram shows the mirror and parallel rays of light from the ray box.



**5 (a) (i)** What type of mirror is shown in the diagram?  
[1 mark]

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**5 (a) (ii)** What is point F called? [1 mark]

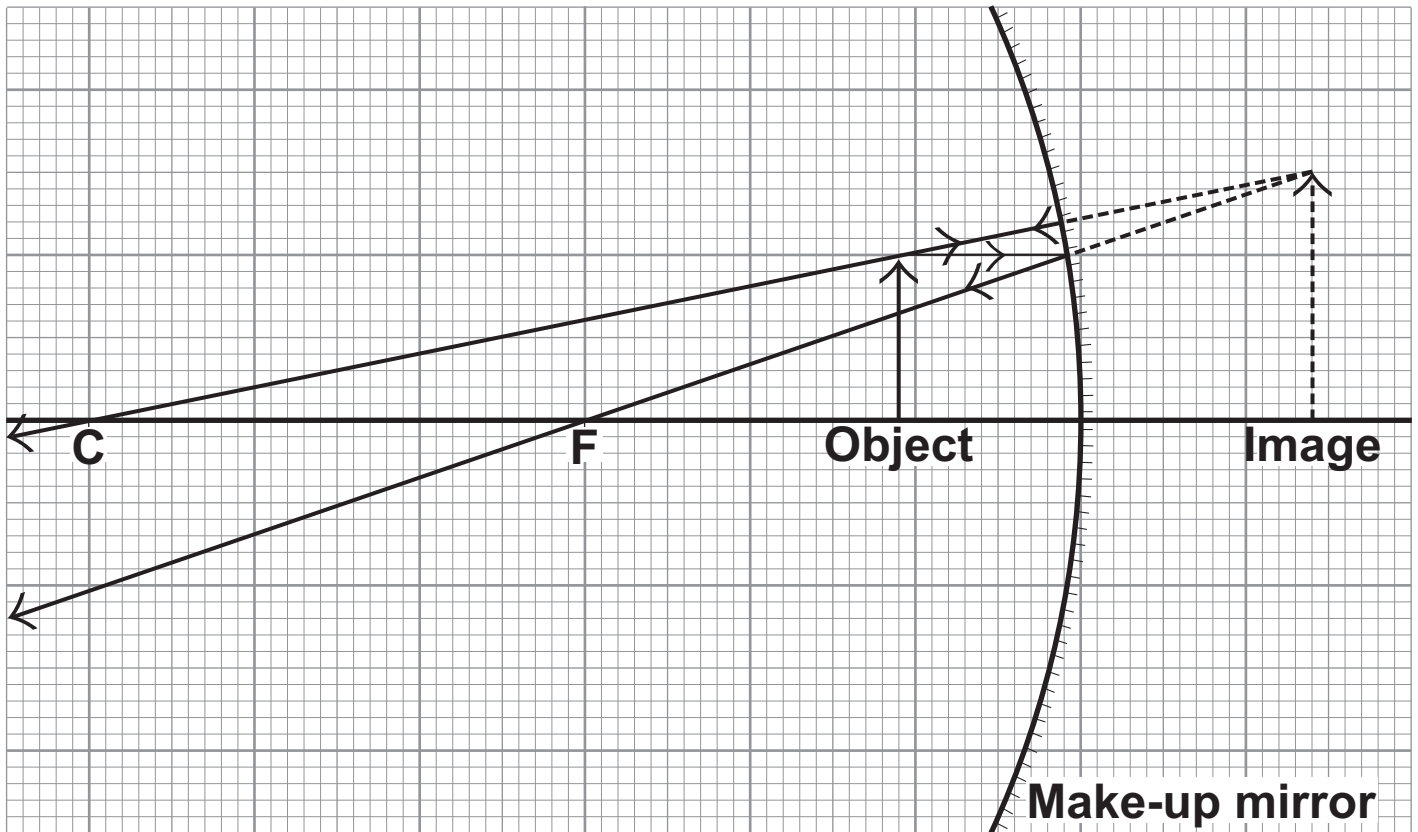
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**5 (a) (iii)** What is the process that takes place at points P, Q, R and S? [1 mark]

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- 5 (b) The diagram shows an object and its image in a curved make-up mirror.



- 5 (b) (i) What type of mirror is shown in the diagram?  
[1 mark]

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[Question 5 continues on the next page]

5 (b) (ii) Use the equation to calculate the magnification produced by the mirror. [2 marks]

$$\text{magnification} = \frac{\text{image height}}{\text{object height}}$$

Show clearly how you work out your answer.

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Magnification = \_\_\_\_\_

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**TURN OVER FOR THE NEXT QUESTION**

- 6 (a)** A student finds data on the Internet for her project on the Solar System. She checks this data on other websites.

The table shows the checked data.

<b>Name of planet</b>	<b>Diameter in km</b>	<b>Distance from Sun in millions of km</b>	<b>Period in days</b>
<b>Mercury</b>	<b>4 840</b>	<b>58</b>	<b>87</b>
<b>Venus</b>	<b>12 390</b>	<b>108</b>	<b>224</b>
<b>Earth</b>	<b>12 760</b>	<b>149</b>	<b>365</b>
<b>Mars</b>	<b>6 800</b>	<b>228</b>	<b>686</b>
<b>Jupiter</b>	<b>142 800</b>	<b>778</b>	<b>4 332</b>
<b>Saturn</b>	<b>119 400</b>	<b>1 428</b>	<b>10 759</b>
<b>Uranus</b>	<b>47 600</b>	<b>2 870</b>	<b>30 685</b>
<b>Neptune</b>	<b>48 400</b>	<b>4 497</b>	<b>60 190</b>

- 6 (a) (i)** In the table, the period of each planet is given in days.

**What is meant by the ‘period’ of a planet?**  
**[1 mark]**

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- 6 (a) (ii)** Suggest why the student checks the data on other websites. **[1 mark]**

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**6 (a) (iii) What is the relationship, if any, between a planet's distance from the Sun and its period? [1 mark]**

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**6 (a) (iv) What is the relationship, if any, between a planet's diameter and its period? [1 mark]**

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**6 (b) What is the force which provides the centripetal force to keep planets in their orbits? [1 mark]**

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**6 (c) What is the name of the galaxy which contains the Solar System? [1 mark]**

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**[Question 6 continues on the next page]**

- 6 (d) Complete the following sentence by drawing a ring around the correct word in the box.  
[1 mark]

The universe is made up of

hundreds

thousands

millions

billions

of galaxies.

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**TURN OVER FOR THE NEXT QUESTION**

7 (a) Read this passage from a health leaflet.

Most children can hear the full range of sounds which can be detected by the human ear. But as people get older, they cannot hear the higher frequencies.

7 (a) (i) Complete this statement. [1 mark]

Most children can detect sounds in the frequency range

\_\_\_\_\_ Hz to \_\_\_\_\_ Hz.

7 (a) (ii) What word is used to describe sound with a frequency so high that it cannot be heard by humans? [1 mark]

\_\_\_\_\_



**7 (b) Read this cutting from a newspaper.**

**A shopkeeper has fitted a special loudspeaker outside his store.**

**“We used to have gangs of young people out there,” he said, “but now, when I switch on the special loudspeaker, they hate the sound and go away.”**

**Older people are not bothered by the sound because the frequency is too high for them to hear it.**

**Some people support the use of the special loudspeaker but other people do not.**

**Give ONE reason against its use. [1 mark]**

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**7 (c) Machines are often very noisy. They transfer energy, and some of the energy is transformed into sound.**

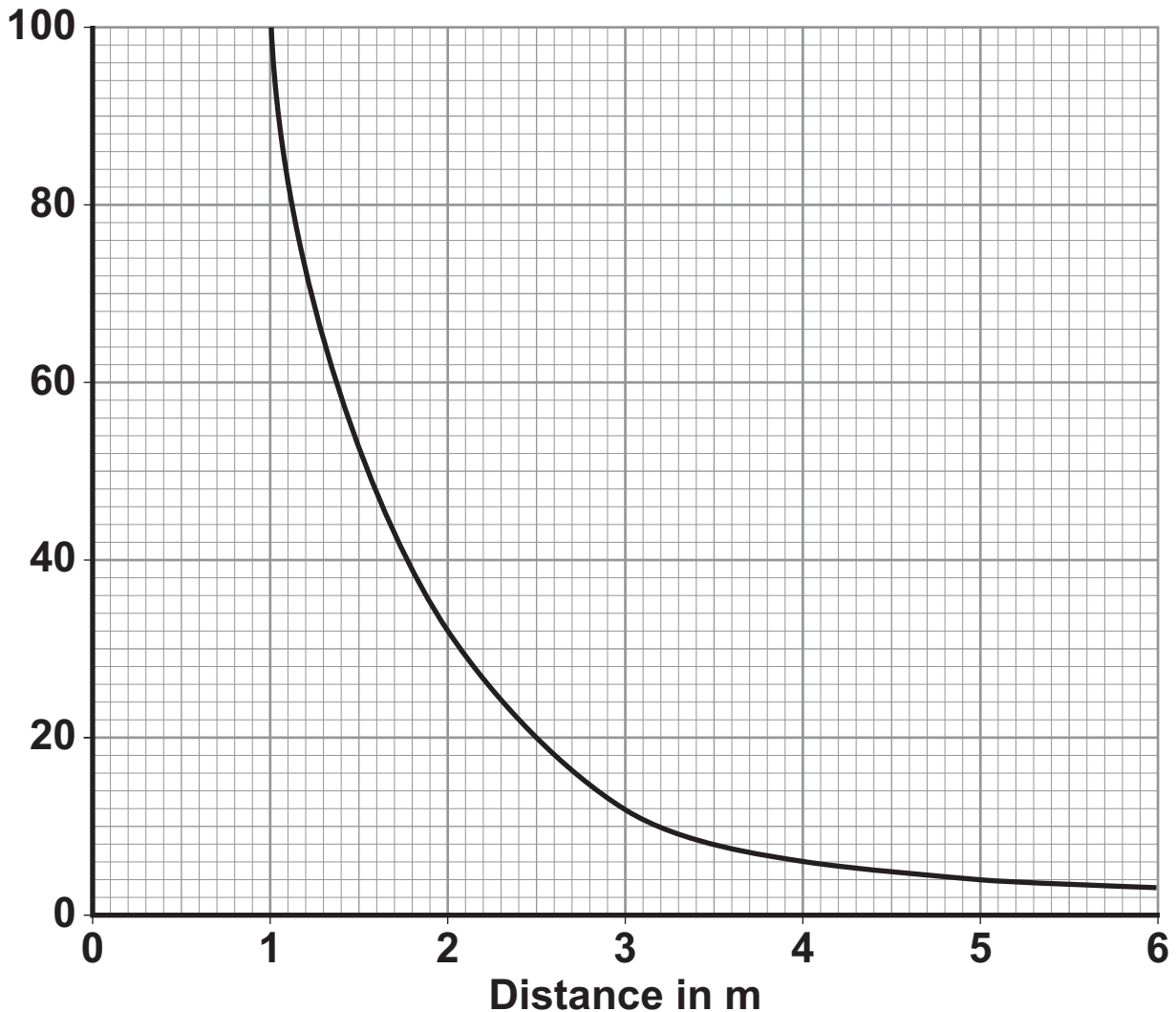
**What is the cause of the sound? [1 mark]**

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**[Question 7 continues on the next page]**

- 7 (d) Sound from a machine may damage the hearing of people who work close by. A safety officer measures the sound intensity at different distances from a noisy machine. The average results are shown on the graph.

Average sound intensity in watts per  $\text{m}^2$



**7 (d) (i) Describe the pattern shown by the graph.  
[2 marks]**

**Use one or more examples from the graph to support your description.**

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**7 (d) (ii) Average results were plotted.**

**Explain why taking results several times and then calculating average values is more reliable than taking only a single result.  
[2 marks]**

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Examiner's Initials	
Question	Mark
1	
2	
3	
4	
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6	
7	
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