

Surname				Other Names				
Centre Number				Candidate Number				
Candidate Signature								

For Examiner's Use

General Certificate of Secondary Education  
June 2009

**PHYSICS**  
**Unit Physics P3**

**Foundation Tier**

Wednesday 10 June 2009 1.30 pm to 2.15 pm

**For this paper you must have:**

- a ruler

You may use a calculator.

Time allowed: 45 minutes

**Instructions**

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- 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.

**PHY3F**  
**F**



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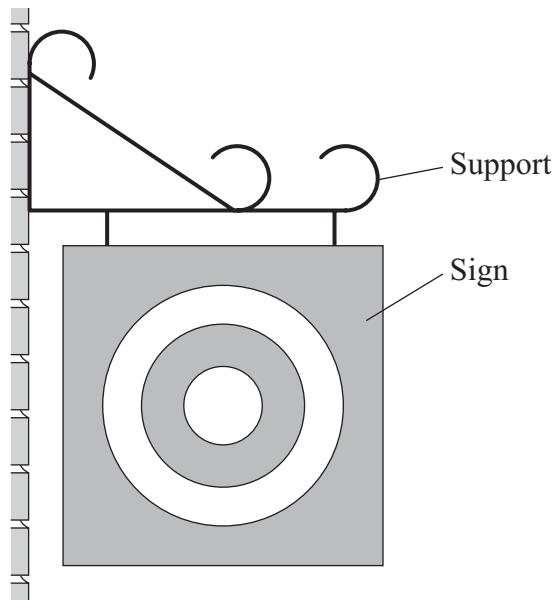
G/K40838 6/6/6/6

**PHY3F**

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Question	Mark	Question	Mark
1	7		
2	8		
3			
4			
5			
6			
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

Answer **all** questions in the spaces provided.

- 1** The drawing shows a sign which hangs outside a shop.



- 1 (a) Draw an X on the sign so that the centre of your X is at the centre of mass of the sign.

(1 mark)

- 1 (b) Use a ruler to draw **one** axis of symmetry on the sign.

(1 mark)

- 1 (c) One force which acts on the sign is its weight.

Complete the following sentence by drawing a ring around the correct line in the box.

The moment of the weight produces a balancing effect.

an accelerating

a balancing

effect.

(1 mark)

3



**Turn over for the next question**

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ANSWER IN THE SPACES PROVIDED**

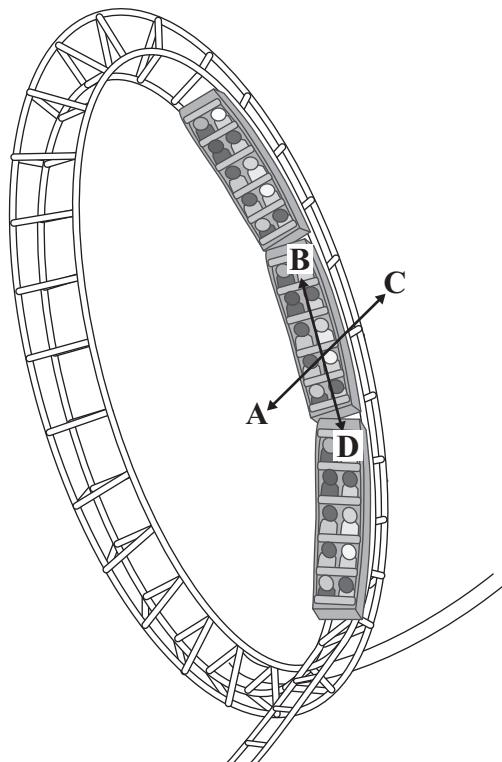
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0 3

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- 2 The drawing shows a set of carriages on a roller coaster.  
The carriages are moving upwards in a nearly circular path at a constant speed.



- 2 (a) Complete the following sentences by drawing a ring around the correct line in each box.

direction  
mass  
speed

(1 mark)

- 2 (a) (i) The carriages will accelerate because of a change in their

- 2 (a) (ii) The resultant force which causes the carriages to accelerate is the

circular  
centripetal force.  
gravity

(1 mark)



0 4

G/K40838/Jun09/PHY3F

- 2 (b) In which direction, **A**, **B**, **C** or **D**, does the resultant force act?

Write your answer in the box.

(1 mark)

- 2 (c) Complete the following sentence by drawing a ring around the correct line in the box.

The resultant force will need to be greater if the

mass of the passengers is greater

radius of the circle is greater .

speed of the carriages is less

(1 mark)

4

**Turn over for the next question**

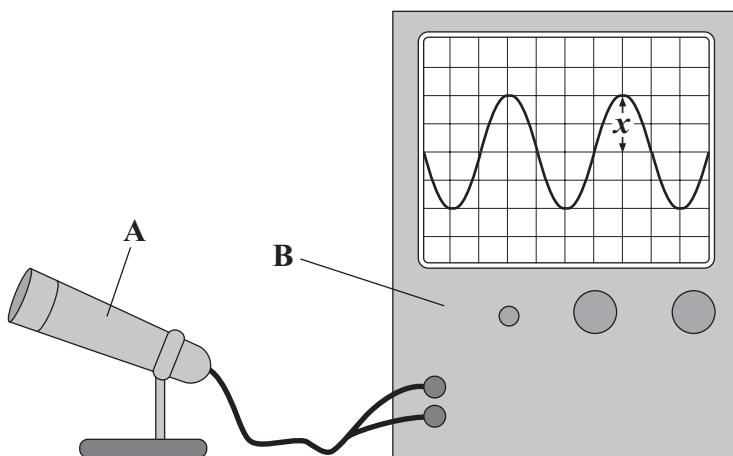
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0 5

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- 3 (a) A student uses two pieces of equipment, **A** and **B**, to display a sound wave.



- 3 (a) (i) Use words from the box to complete the sentence.

**a loudspeaker      a microphone      an oscilloscope      a screen**

**A** is ..... and **B** is ..... .  
(2 marks)

- 3 (a) (ii) Use words from the box to complete the sentence.

**the amplitude      half the amplitude      the frequency      half the frequency**

The distance  $x$  marked on the diagram measures ..... of the sound wave.

(1 mark)

- 3 (a) (iii) Complete the sentence.

The distance  $x$  becomes smaller. This is because the sound has

become .....  
(1 mark)



0 6

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- 3 (b) There is no air in space.

Astronauts in space cannot hear sounds from outside their spacesuits.

Explain this.

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

(2 marks)

6

**Turn over for the next question**

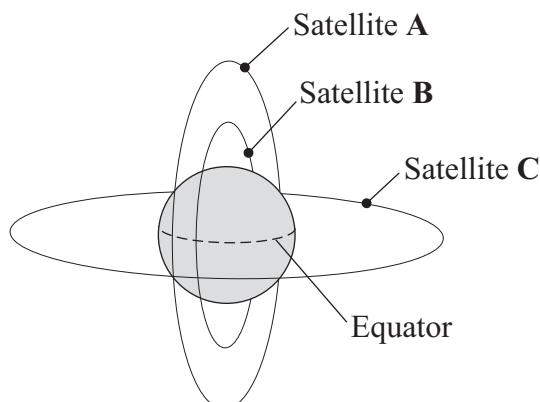
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0 7

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- 4 (a) The following diagram shows three satellites, **A**, **B** and **C**, in orbit around the Earth. The diagram is not to scale.



- 4 (a) (i) Complete the following table. Each letter may be used once, more than once or not at all.

Description of satellite	Is this satellite <b>A</b> , <b>B</b> or <b>C</b> ?
It is in a low polar orbit.	
It is in a geostationary orbit.	
It is used as a monitoring satellite.	

(3 marks)

- 4 (a) (ii) How long does a satellite in a geostationary orbit take to complete one orbit?

..... hours  
(1 mark)



0 8

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- 4 (b) A rocket is used to carry a satellite into position.

Complete the following sentence by drawing a ring around the correct line in the box.

As the distance between the rocket and the Earth increases, the force of

gravity between the rocket and the Earth

decreases  
stays the same  
increases

(1 mark)

- 4 (c) Satellites cost many millions of pounds to build and to put into orbit. Some people think that this is a waste of money.

- 4 (c) (i) Suggest **one** reason why some people may have this opinion.

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

(1 mark)

- 4 (c) (ii) Suggest **one** reason why other people may disagree with this opinion.

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

(1 mark)

7

**Turn over for the next question**

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0 9

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5 In the diagram below, a frog sits on a rock in a pond.

5 (a) Complete the following sentences by drawing a ring around the correct line in the box.

5 (a) (i) The frog can see its image in the pond because the surface of the pond acts

	concave	
like a	convex	mirror.
	plane	

(1 mark)

5 (a) (ii) Draw a ring around each of **two** words from the box below to describe the image in the pond.

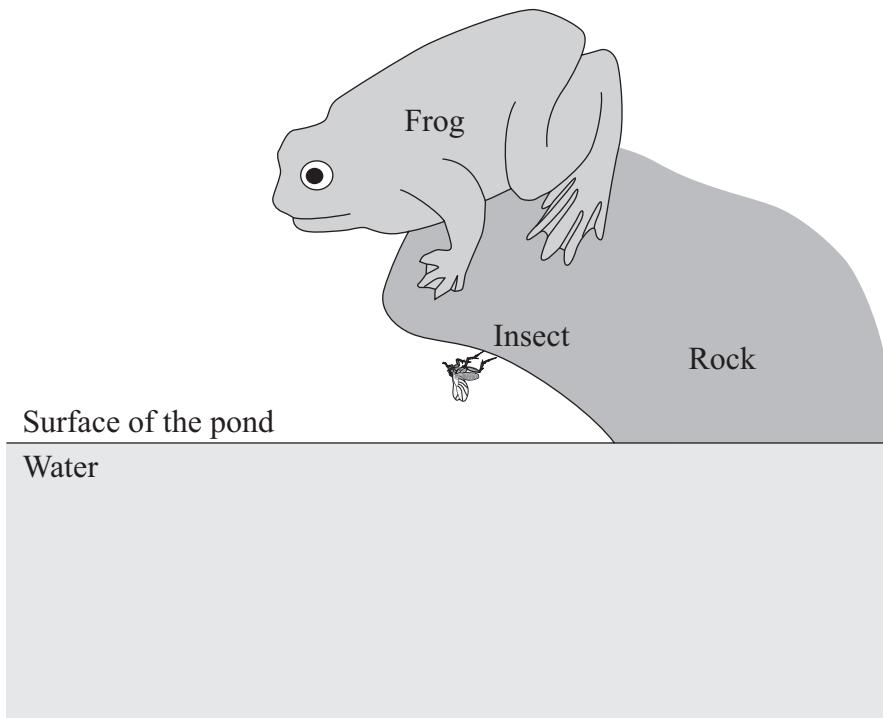
bigger	inverted	real	smaller	upright	virtual
--------	----------	------	---------	---------	---------

(2 marks)

5 (b) There is an insect underneath the rock.

Use a ruler to draw rays of light on the diagram to show how the frog uses reflection to see the insect.

Mark the direction of the rays.



(3 marks)

**6**



1 0

- 6 This passage is from a science magazine.

*A star forms when enough dust and gas are pulled together.  
Masses smaller than a star may also be formed when dust and  
gas are pulled together.*

- 6 (a) What is the force which pulls the dust and gas together?

.....  
*(1 mark)*

- 6 (b) Complete the sentences.

- 6 (b) (i) The smaller masses may be attracted by the star and become

.....  
*(1 mark)*

- 6 (b) (ii) Our nearest star, the Sun, is stable because the gravitational forces

and the radiation pressure are .....  
*(1 mark)*

- 6 (b) (iii) The Sun is one of billions of stars in the galaxy called the

.....  
*(1 mark)*

4

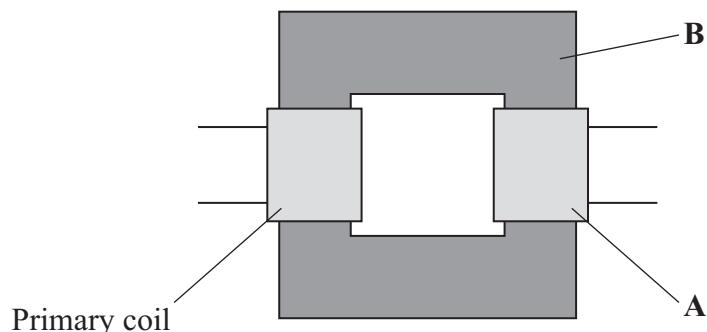
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1 1

- 7 (a) The diagram shows a transformer.



- 7 (a) (i) What is part A?

.....  
(1 mark)

- 7 (a) (ii) What is part B and what is it made of?

.....  
.....  
(2 marks)

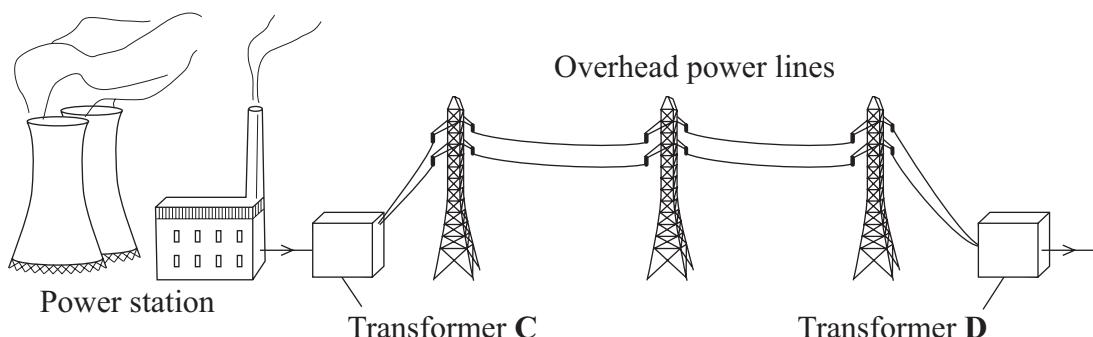
- 7 (a) (iii) When there is an alternating current in the primary coil, what is produced in part B?

.....  
.....  
(2 marks)



1 2

- 7 (b) Transformers are used in the National Grid. The diagram shows part of the National Grid.



Complete the **two** spaces in the sentence.

Transformer C is a ..... transformer and transformer D is  
a ..... transformer.

(1 mark)

- 7 (c) This is an item from a newspaper.

### Health at risk from power lines?

Are high voltage power lines a health risk to people who live near them?

Some scientists think that scientific evidence shows that they are.

Other scientists do not think that the scientific evidence supports this conclusion.

Which **two** suggestions would reduce the possible risk to people's health?  
Put a tick (✓) in the box next to your answers.

Do not build new houses near to existing power lines.

Move the power lines so that they take the shortest routes.

Move each power station to the centre of the nearest city.

Build new power lines away from where people live.

Use more transformers in the National Grid.

(2 marks)

8

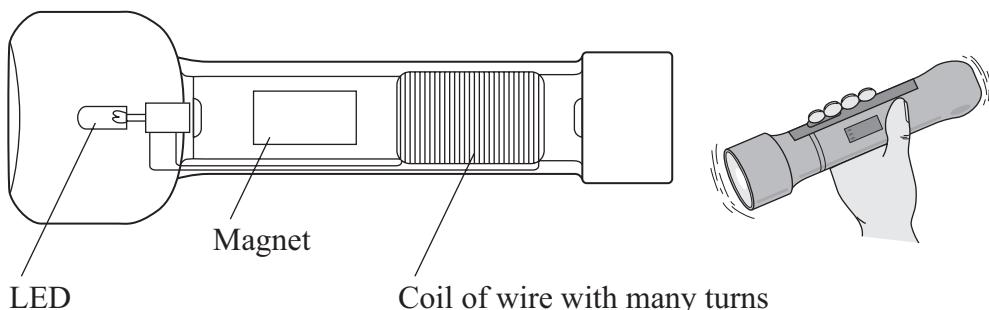
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1 3

- 8** The diagram shows some parts of a torch which works without batteries. The coil is part of a complete circuit with the LED (light-emitting diode).

You have to shake the torch for a short time and then it is ready to use.



- 8** (a) Arrange the letters, **A**, **B**, **C**, **D** and **E**, in the correct order to explain how shaking the torch produces an electric current.

- A** An electric current is induced in the circuit.
- B** The magnetic field cuts through the coil.
- C** The magnet moves in and out of the coil.
- D** A potential difference (p.d.) is induced across the ends of the coil.
- E** The torch is shaken to and fro.

The first letter has been done for you.






(2 marks)

- 8** (b) Give **two** changes which you would make to the design of the torch to increase the size of the induced potential difference.

1 .....

.....

2 .....

.....

(2 marks)



- 8 (c)** A few minutes after shaking, the LED gets dimmer and then stops giving out light.

A student tests the torch. She shakes it for a period of time. Then she switches it on and times how long the light lasts.

These are her results.

Period of time torch is shaken measured in seconds	How long the light lasts measured in seconds
30	168
60	312
90	420
120	546
150	654

- 8 (c) (i)** What conclusion can the student come to on the basis of these results?

.....

.....

(1 mark)

- 8 (c) (ii)** The student's friend says that the results are **not** reliable. Her friend is correct.

Give **two** reasons why.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

7

**END OF QUESTIONS**



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