

Surname					Other Names				
Centre Number					Candidate Number				
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For Examiner's Use

General Certificate of Secondary Education
January 2009



PHYSICS
Unit Physics P3

PHY3F
F

Foundation Tier

Monday 19 January 2009 9.00 am to 9.45 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> a ruler. <p>You may use a calculator.</p>

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.

For Examiner's Use			
Question	Mark	Question	Mark
1		7	
2		8	
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
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J A N O 9 P H Y 3 F O 1

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

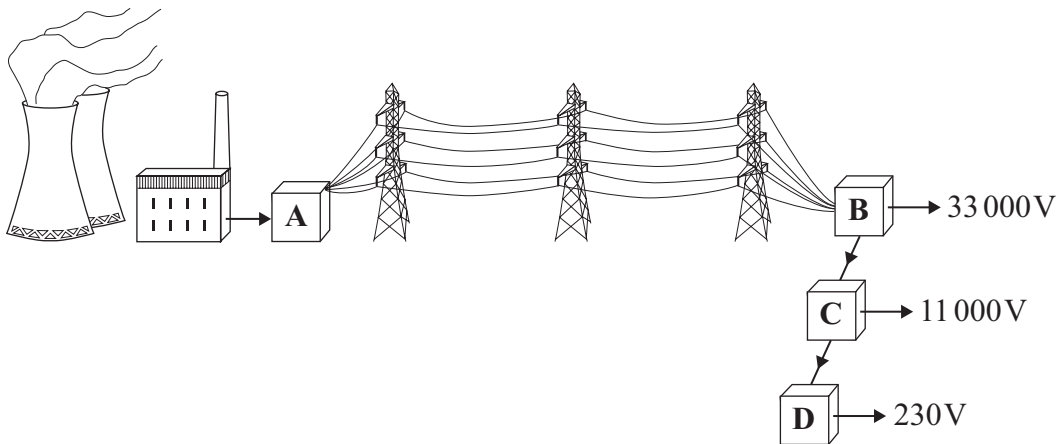
1 Electricity is generated in power stations. It is then sent to all parts of the country through a network of cables.

1 (a) Complete the following sentence by using **one** of the words in the box.

Grid	Power	Supply
-------------	--------------	---------------

The network is called the National
(1 mark)

1 (b) In the diagram, **A**, **B**, **C** and **D** are transformers.



1 (b) (i) Which transformer, **A**, **B**, **C** or **D**, is a step-up transformer?

Transformer (1 mark)

1 (b) (ii) Which transformer, **A**, **B**, **C** or **D**, will supply homes, offices and shops?

Transformer (1 mark)



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

In a step-down transformer, the potential difference (p.d.) across the

primary coil is

less than
the same as
more than

 the p.d. across the secondary coil.

(1 mark)

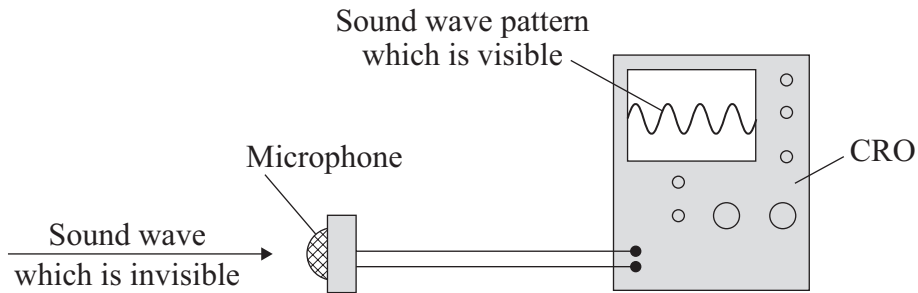
4

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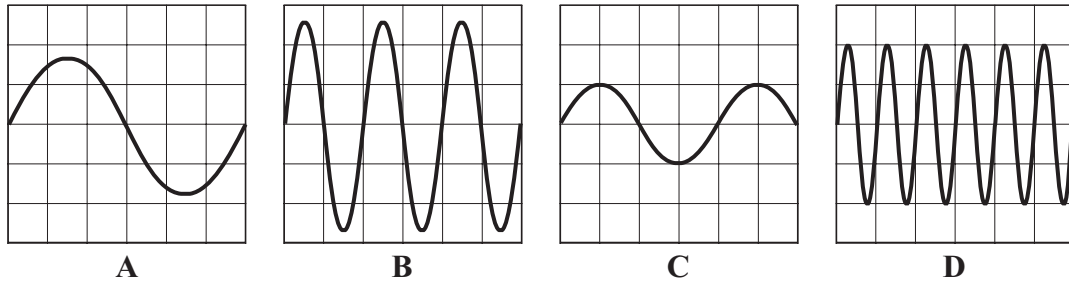


2 A microphone and a cathode ray oscilloscope (CRO) can be used to show the pattern of a sound wave.



Four sound wave patterns, **A**, **B**, **C** and **D**, are shown.

They are all drawn to the same scale.



- 2 (a) Which **one** of the patterns has the smallest amplitude?
- 2 (b) Which **one** of the patterns has the lowest frequency?
 (2 marks)

2



Turn over for the next question

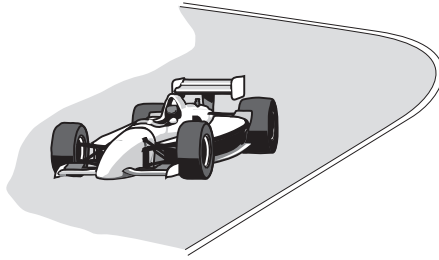
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0 5

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



A racing car can accelerate by changing

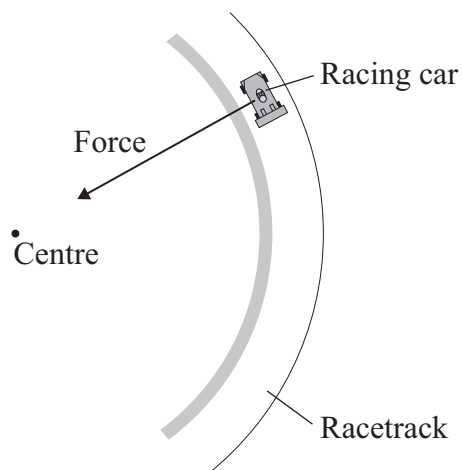
its direction only

its speed only

either its direction or its speed

(1 mark)

- 3 (b) A racing car moves round a circular part of a racetrack.



A force acts on the racing car. The force is towards the centre of the circular part of the racetrack.



Complete the following sentences by drawing a ring around the correct line in each of the boxes.

3 (b) (i) The force is caused by

electrostatics
friction
gravity

(1 mark)

3 (b) (ii) The force is a

centripetal force
circular force
perpendicular force

(1 mark)

3 (b) (iii) If another racing car has a greater mass and travels at the same speed

around the same racetrack, then the force will need to

decrease
stay the same
increase

(1 mark)

3 (b) (iv) When the racing car goes faster, the force will need to

decrease
stay the same
increase

(1 mark)

Question 3 continues on the next page

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

No to racetrack plan

At last night's meeting, one local resident said, "The racetrack will be noisy but motor racing leads to safety improvements in all our cars."

"We'll need better brakes. Motor racing encourages speeding and leads to more accidents", said another.

Most of the residents were against the plan to build a racetrack.

Do you agree with most of the residents?

Put a tick (✓) in the box next to your answer and explain.

Yes No Not sure

.....

.....

.....

.....

(2 marks)

7



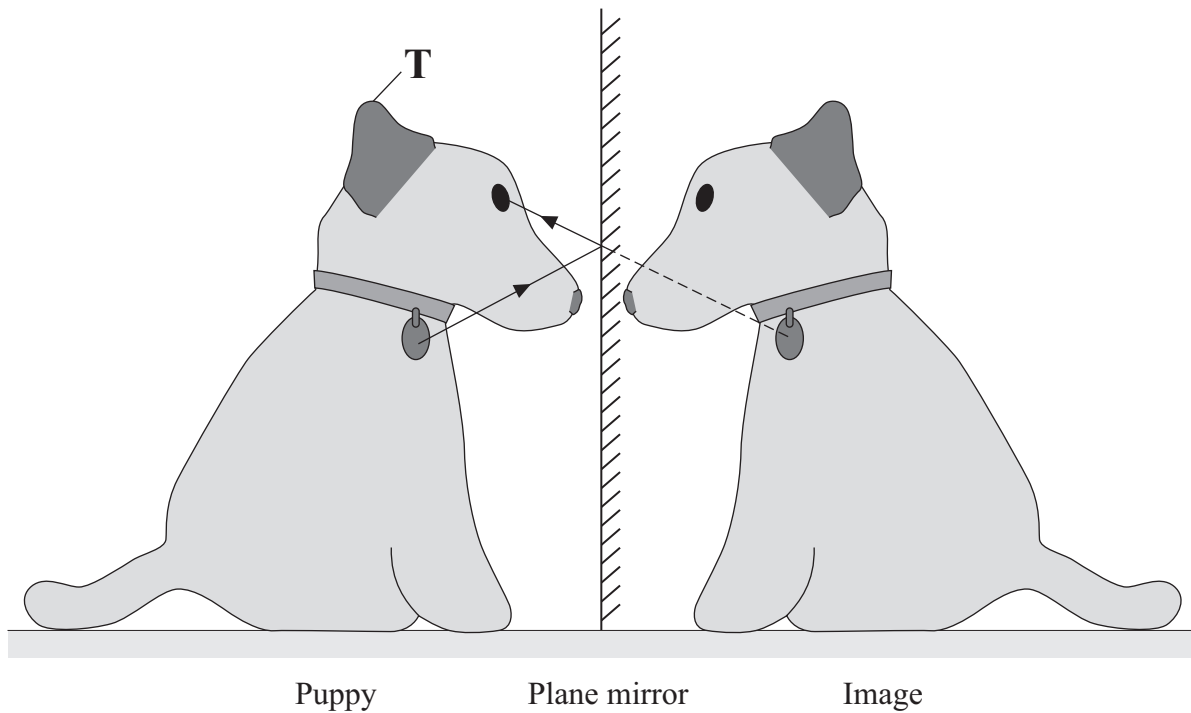
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- 4 A puppy can see an image of himself in a plane mirror.



The diagram shows how the puppy can see his disc.

- 4 (a) On the diagram, use a ruler to draw a ray to show how the puppy can see the top of his ear, which is marked as **T**. (3 marks)
- 4 (b) What is a plane mirror?

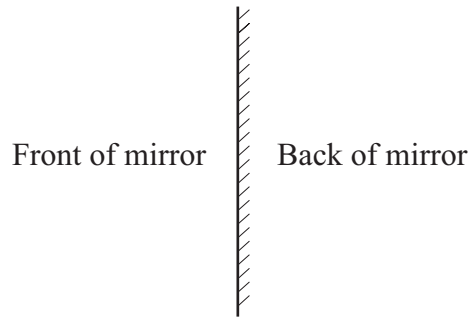
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.....

(1 mark)



4 (c) In the puppy diagram, a plane mirror is shown as follows.



Name the type of mirror shown in each of the following diagrams.

4 (c) (i)



This is a mirror.

(1 mark)

4 (c) (ii)



This is a mirror.

(1 mark)

6

Turn over ►



5 (a) Choose the best words from the box to complete the following sentences.

billions	fission	friction	fusion	gases
gravity	liquids	millions	thousands	

5 (a) (i) Stars form when enough dust and from space are pulled together by
(2 marks)

5 (a) (ii) Stars are able to give out energy for millions of years by the process of
(1 mark)

5 (a) (iii) The Sun is one of many of stars in our galaxy.
(1 mark)

5 (b) What is the name of our galaxy?
.....
(1 mark)

5



6 Many electrical appliances use the circular motion produced by their electric motor.

6 (a) Put ticks (✓) in the boxes next to **all** the appliances in the list which have an electric motor.

electric drill

electric fan

electric food mixer

electric iron

electric kettle

electric screwdriver

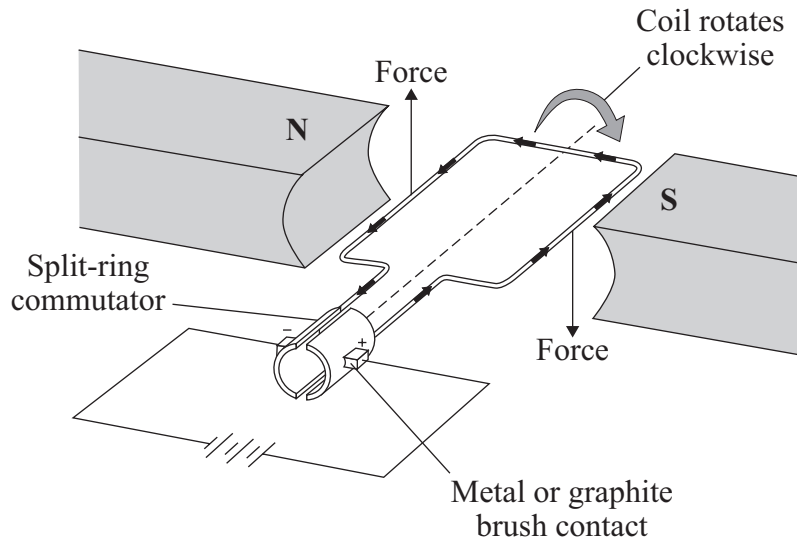
(2 marks)

Question 6 continues on the next page

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6 (b) One simple design of an electric motor is shown in the diagram. It has a coil which spins between the ends of a magnet.



6 (b) (i) Give **two** ways of reversing the direction of the forces on the coil in the electric motor.

1

.....

2

.....

(2 marks)

6 (b) (ii) Give **two** ways of increasing the forces on the coil in the electric motor.

1

.....

2

.....

(2 marks)

6



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- 7 (a) This information is from a science magazine.

Electronic systems can be used to produce ultrasonic waves. These waves have a frequency higher than the upper limit for hearing in humans.

Complete the sentence by choosing the correct number from the box.

20 2000 20 000 200 000

The upper limit for hearing in humans is a frequency of Hz.
(1 mark)

- 7 (b) An electronic system produces ultrasound with a frequency of 500 kHz.

What does the symbol kHz stand for?

.....
(1 mark)

- 7 (c) (i) State **one** industrial use for ultrasound.

.....
(1 mark)

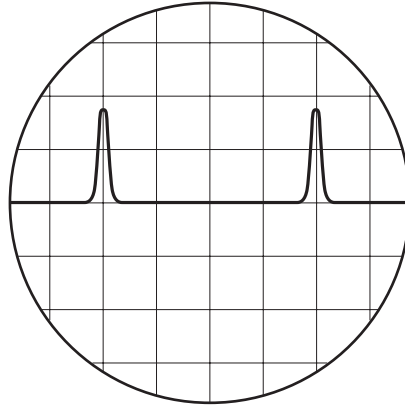
- 7 (c) (ii) State **one** medical use for ultrasound.

.....
(1 mark)



- 7 (d) An ultrasound detector is connected to an oscilloscope.

The diagram shows centimetre squares on an oscilloscope screen. Each horizontal division represents 2 microseconds.



Calculate the time, in microseconds, between one peak of one ultrasound pulse and the peak of the next.

.....

Time = microseconds
(1 mark)

- 7 (e) Ultrasounds are partially reflected when they reach a boundary between two different media. The time taken for the reflection from the boundary to reach the detector can be seen from the screen.

What can be calculated from this time interval?

.....

.....

(2 marks)

- 7 (f) Explain what action scientists should take if they find evidence that ultrasonic waves may be harmful to human health.

.....

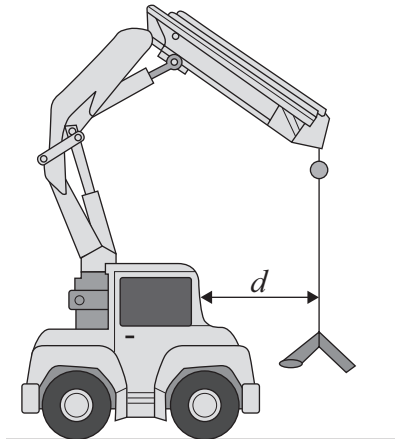
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(2 marks)



- 8 The diagram shows a small mobile crane. It is used on a building site.



The distance, d , is measured to the front of the cab.

The table shows information from the crane driver's handbook.

Load in kilonewtons (kN)	Maximum safe distance, d , in metres (m)
10	6.0
15	4.0
24	2.5
40	1.5
60	1.0

- 8 (a) What is the relationship between the load and the maximum safe distance?

.....

.....

.....

(2 marks)



- 8 (b) The crane driver studies the handbook and comes to the conclusion that a load of 30 kN would be safe at a distance, d , of 2.0 metres.

Is the driver correct?

Explain your answer.

.....

.....

.....

.....

(2 marks)

- 8 (c) What is the danger if the driver does not follow the safety instructions?

.....

.....

(1 mark)

- 8 (d) How should the data in the table have been obtained?

Put a tick (✓) in the box next to your answer.

average results from an opinion poll of mobile crane drivers

copied from a handbook for a similar crane

results of experiments on a model mobile crane

results of experiments on this mobile crane

(1 mark)

6

END OF QUESTIONS



There are no questions printed on this page

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