Write your name here

Surname	Other names

Centre Number | | | | | |

Candidate Number | | | | |

Edexcel GCSE

Physics/Science

Unit P1: Universal Physics

Foundation Tier

Thursday 8 November 2012 – Morning
Time: 1 hour

Paper Reference
5PH1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P41763A

1/1/1/1/1/

P 4 1 7 6 3 A 0 1 2 0

PEARSON

FORMULAE

You may find the following formulae useful.

wave speed = frequency × wavelength $v = f \times \lambda$

$$\text{wave speed} = \frac{\text{distance}}{\text{time}} \qquad v = \frac{x}{t}$$

electrical power = current × potential difference $P = I \times V$

cost of electricity = power × time × cost of 1 kilowatt-hour

$$\text{power} = \frac{\text{energy used}}{\text{time taken}} \qquad P = \frac{E}{t}$$

$$\text{efficiency} = \frac{\text{(useful energy transferred by the device)}}{\text{(total energy supplied to the device)}} \times 100\,\%$$

BLANK PAGE

Questions begin on next page.

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Electromagnetic spectrum

1 (a) The diagram shows a section of the electromagnetic spectrum.

Five parts of this have been named.

infrared	1	2	3	green	blue	indigo	4	ultraviolet

State the names of the other four parts, 1, 2, 3 and 4, in the spaces below.

(2)

Part 1 .....

Part 2 .....

Part 3 .....

Part 4 .....

(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

Infrared radiation is used for

(1)

☒ **A** cooking

☒ **B** suntanning

☒ **C** curing cancer

☒ **D** sterilising water

(c) Describe how ultraviolet radiation is used in the detection of forged bank notes.

(2)

.....

.....

.....

.....

(d) Explain the difference in potential danger between ultraviolet radiation and infrared radiation.

(2)

.....

.....

.....

.....

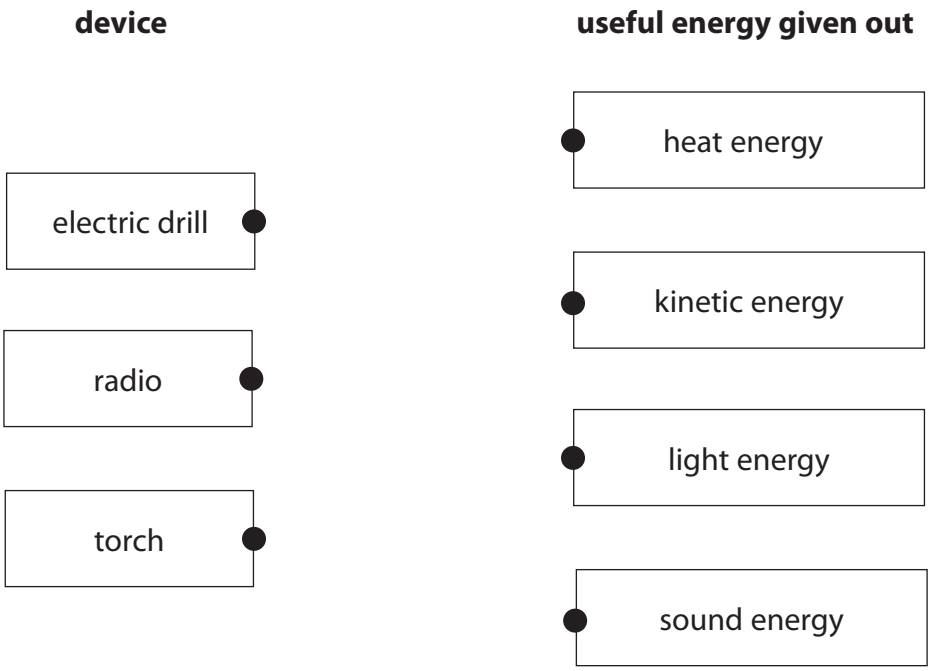
(Total for Question 1 = 7 marks)

Energy transfers

2 (a) An electric drill, a radio and a torch all convert electrical energy into other forms of energy.

(i) Draw one straight line from each device to the most useful form of energy that it gives out.

(3)

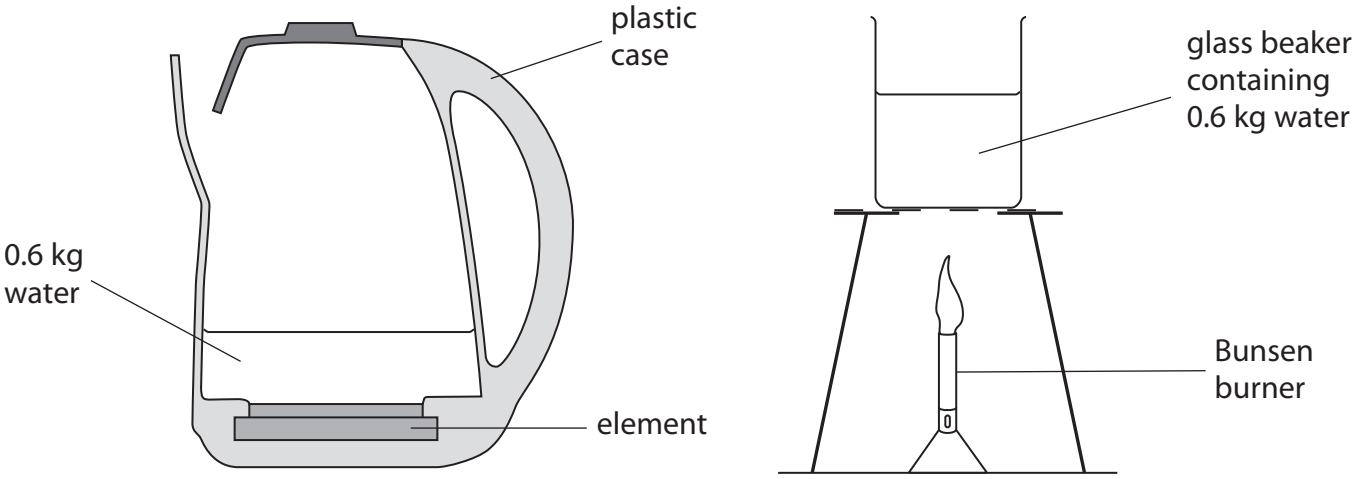


(ii) State the name of the one form of energy that is wasted by these devices.

(1)

.....

(b) The diagrams show two ways of heating water.



(i) The electric kettle is supplied with 2500 joules of energy each second.

The water in the kettle gains 2200 joules of heat energy each second.

Calculate the amount of energy wasted each second.

(1)

energy wasted each second = ... J

(ii) Complete the diagram to show the main energy transfer that takes place when the Bunsen burner is used to heat the water.

(1)

..... energy → ..... energy

(iii) Explain why heating the water using the kettle and the Bunsen burner waste different amounts of energy.

(2)

.....

.....

.....

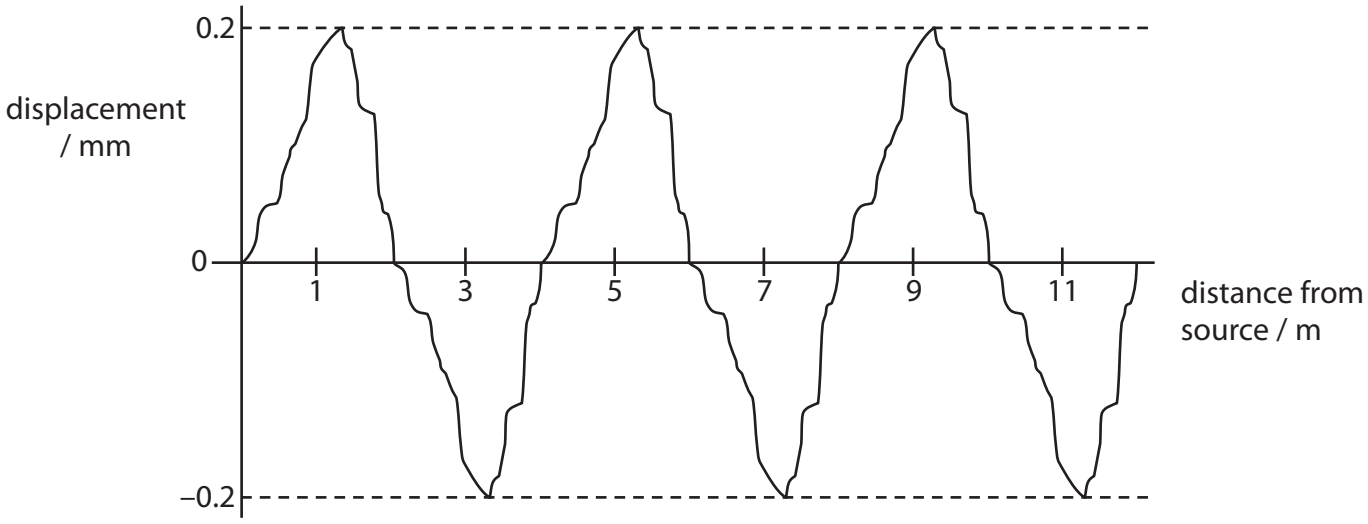
.....

(Total for Question 2 = 8 marks)

BLANK PAGE

Sound waves and music

3 (a) Here is a graph of a sound wave.



(i) Calculate the wavelength of this sound wave.

(2)

wavelength = ... m

(ii) A second sound wave has a longer wavelength but a smaller amplitude.

Sketch a graph of this second wave, on the axes above.

(2)

(b) (i) Sound is a longitudinal wave.

State another example of a longitudinal wave.

(1)

.....

(ii) Explain how a longitudinal wave is different from a transverse wave.

You may draw a diagram to help with your answer.

(2)

.....

.....

.....

.....

(c) Musical notes can be made by rubbing the top of a drinking glass with a wet finger.

The photographs show four different amounts of water in the glass.

The frequencies of the musical notes produced with three amounts of water are shown.

1047 Hz

1174 Hz

1245 Hz

f Hz

(i) Which of these numbers could be the frequency, **f**, if it follows the same pattern?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** 960

☒ **B** 1109

☒ **C** 1200

☒ **D** 1290

(ii)

wavelength = speed / frequency

The speed of sound in air is 340 m/s.

A student listens to the sound from the glass when it contains the largest amount of water.

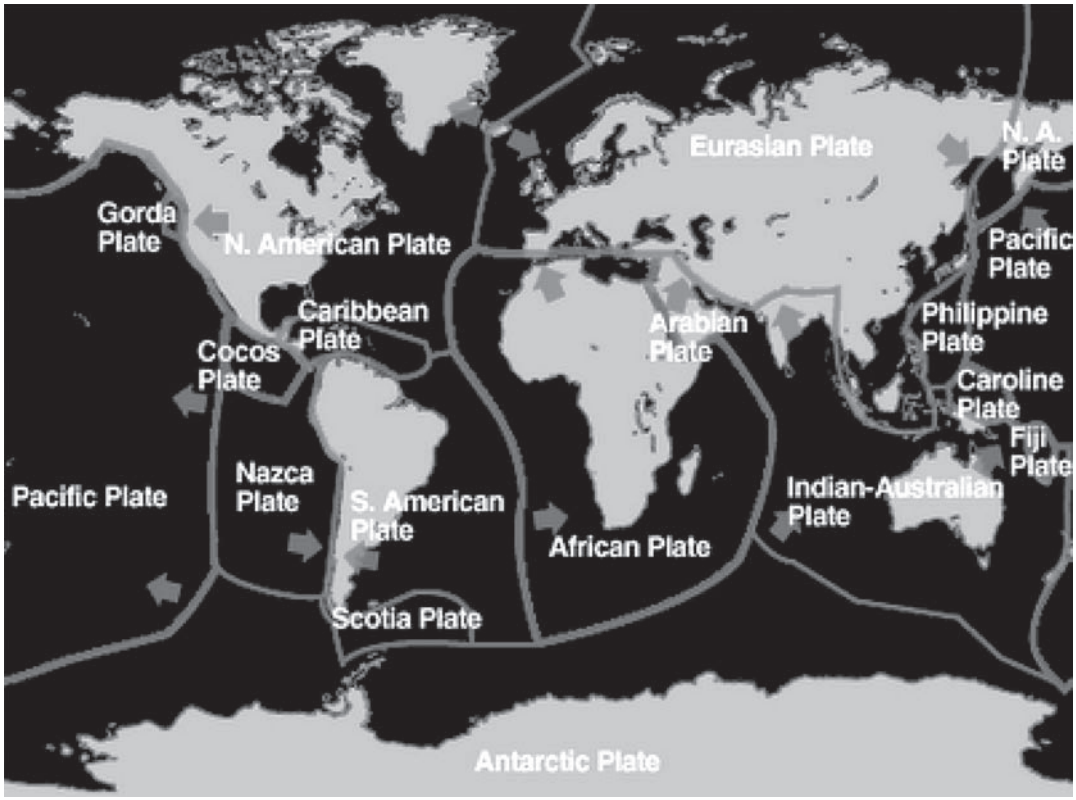
Show that the wavelength of the wave he hears is about 30 cm.

(3)

(Total for Question 3 = 11 marks)

Earthquakes

4 The diagram shows the plates which make up the Earth's outermost layer.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Earthquakes happen when plates

(1)

- ☒ **A** float on the mantle
- ☒ **B** rub against each other
- ☒ **C** move away from each other
- ☒ **D** erupt from volcanoes

(ii) Explain what causes the plates to move.

(2)

.....

.....

.....

.....

(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

The instrument used to detect earthquakes is a

(1)

☒ **A** hydrometer

☒ **B** manometer

☒ **C** seismometer

☒ **D** thermometer

(c) Earthquakes produce P-waves and S-waves.

(i) Describe what can happen to these waves when they reach the boundary between the crust and the mantle.

(2)

.....

.....

.....

.....

(ii) A P-wave takes 200 s to travel a distance of 1200 km.

Calculate its speed in km/s.

(2)

speed of P-wave = ... km/s

(d) Explain why scientists find it difficult to predict when a tsunami may happen.

(2)

.....

.....

.....

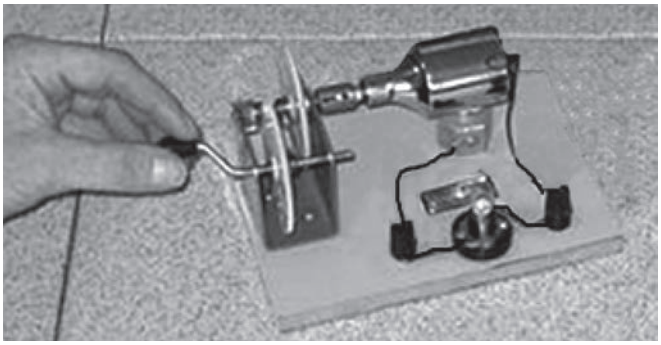
.....

(Total for Question 4 = 10 marks)

Generating electricity

5 The photograph shows a small generator.

When the handle is turned the current produced lights a lamp.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The current produced

(1)

- ☒ **A** usually comes from a battery
- ☒ **B** always has the same frequency
- ☒ **C** is always the same size
- ☒ **D** is usually alternating in direction

(ii) State the unit in which electric current is usually measured.

(1)

.....

(b) (i) Describe what happens inside the generator to produce the current.

(3)

.....

.....

.....

.....

.....

.....

(ii) State **one** way in which the size of the current could be increased.

(1)

.....

.....

*(c) The National Grid is supplied with electricity from large-scale electrical generators.

These generators may be driven using different energy sources.

Compare the use of a non-renewable energy source with the use of a renewable energy source to produce electricity for the National Grid.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 5 = 12 marks)

BLANK PAGE

The Solar System

6 The diagram shows four moons which orbit Jupiter.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Jupiter is

(1)

- ☒ **A** a comet
- ☒ **B** a galaxy
- ☒ **C** a planet
- ☒ **D** a universe

(ii) Galileo used a new invention to observe these moons.

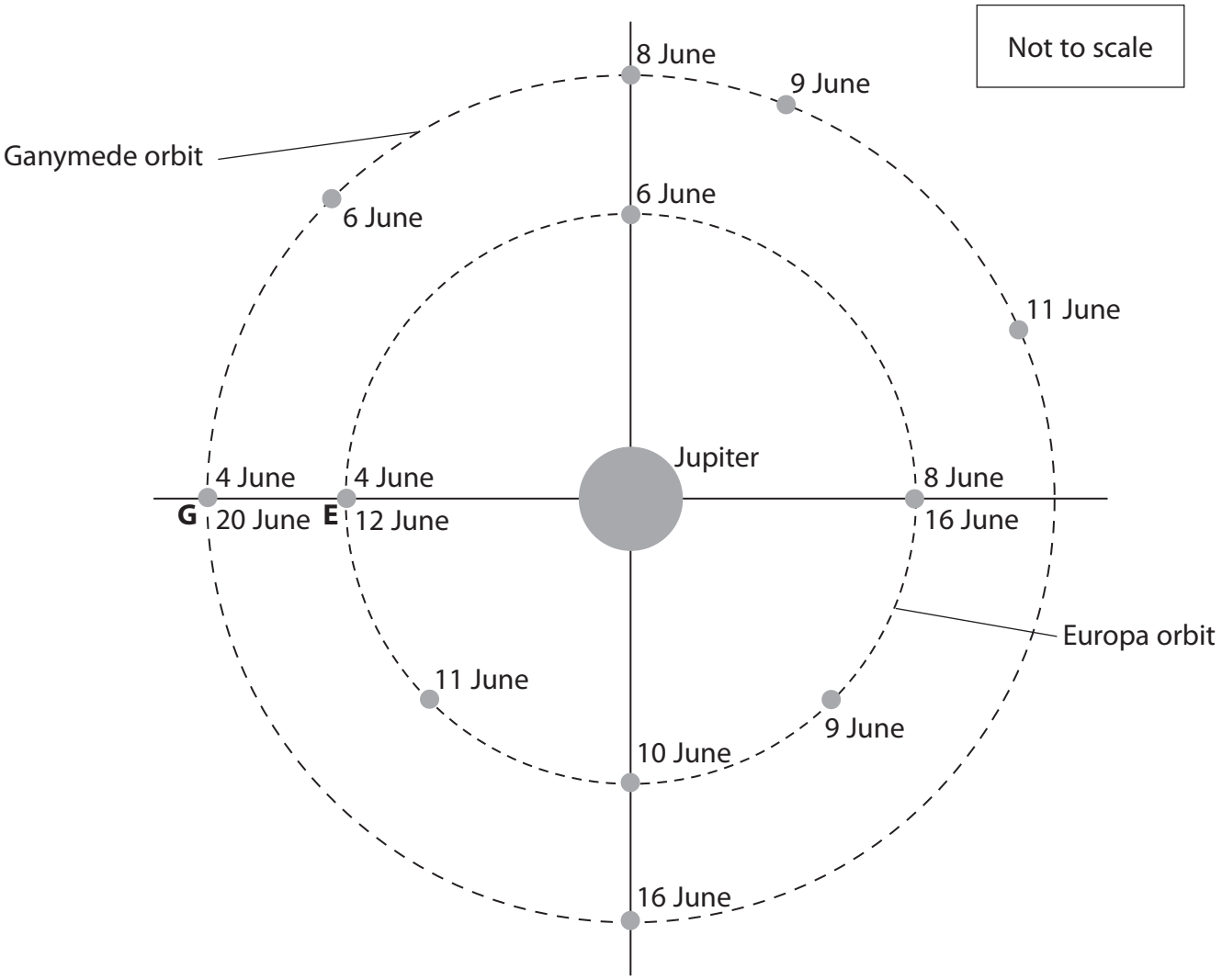
The invention he used was called a .....

(1)

(b) The diagram shows the moons Europa (**E**) and Ganymede (**G**) in orbit round Jupiter.

The radius of Europa's orbit is 671 000 km.

The radius of Ganymede's orbit is 1 070 000 km.



The positions of the moons on some dates are marked.

(i) On which one of the marked dates were the moons closest together?

(1)

.....

(ii) Use information from the diagram to calculate the time for Ganymede to complete one orbit of Jupiter.

(1)

time for one orbit = ... days

(iii) Calculate the distance from Europa to Ganymede on 12 June.

(2)

distance apart = ... km

*(iv) Describe how the distance between Europa and Ganymede changes during three orbits of Europa.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

BLANK PAGE