



Rewarding Learning

General Certificate of Secondary Education
2013

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Candidate Number

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Science: Physics

Unit P2

Foundation Tier

[GPH21]

MONDAY 24 JUNE, MORNING



GPH21

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided. Do not write outside the box, around each page or on blank pages.

Complete in blue or black ink only. **Do not write with a gel pen.**

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

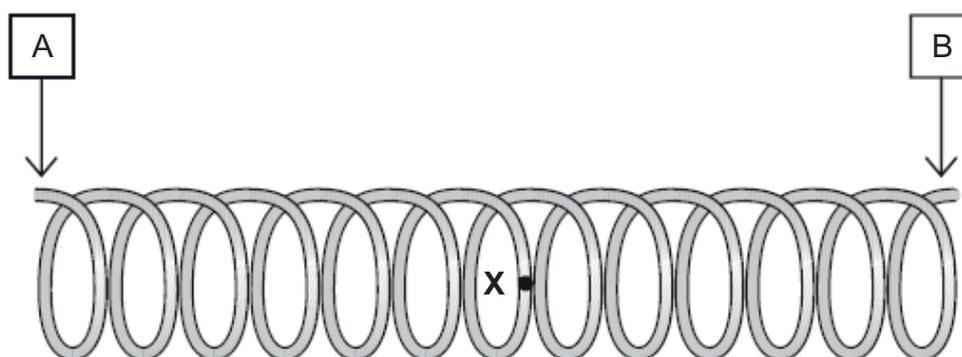
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in question **4(b)**.

8005.04R



- 1 (a) A stretched spring rests on a table.
A wave travels from end A to end B.



Describe **carefully** how point **X** will move when

- (i) a **transverse** wave passes along the spring;

[2]

- (ii) a **longitudinal** wave passes along the spring.

[2]

- (iii) Give another example of a transverse wave and another example of a longitudinal wave.

Transverse: _____

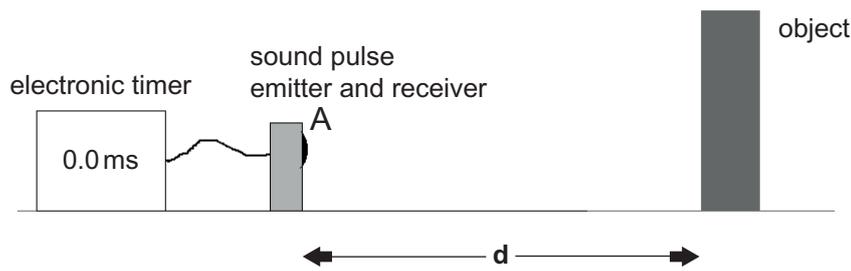
Longitudinal: _____ [2]

Examiner Only

Marks Remark



(c) To study the reflection of sound from a solid object the apparatus below was used.



A pulse of sound was emitted by the device at A and the time taken for the sound pulse to travel **to the object and back again** (round trip time) was measured.

This was repeated for different distances d .

The results of the investigation are shown in the table below.

Distance d in m	Time for the round trip in ms	Time to travel the distance d in ms
0.2	1.2	
0.4	2.6	
0.6	3.4	
0.8	4.8	
1.0	6.0	

- (i) Complete the table above by calculating the time for the pulse of sound to travel the distance d . [1]
- (ii) Using the equation below and data from the table calculate the speed of sound.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

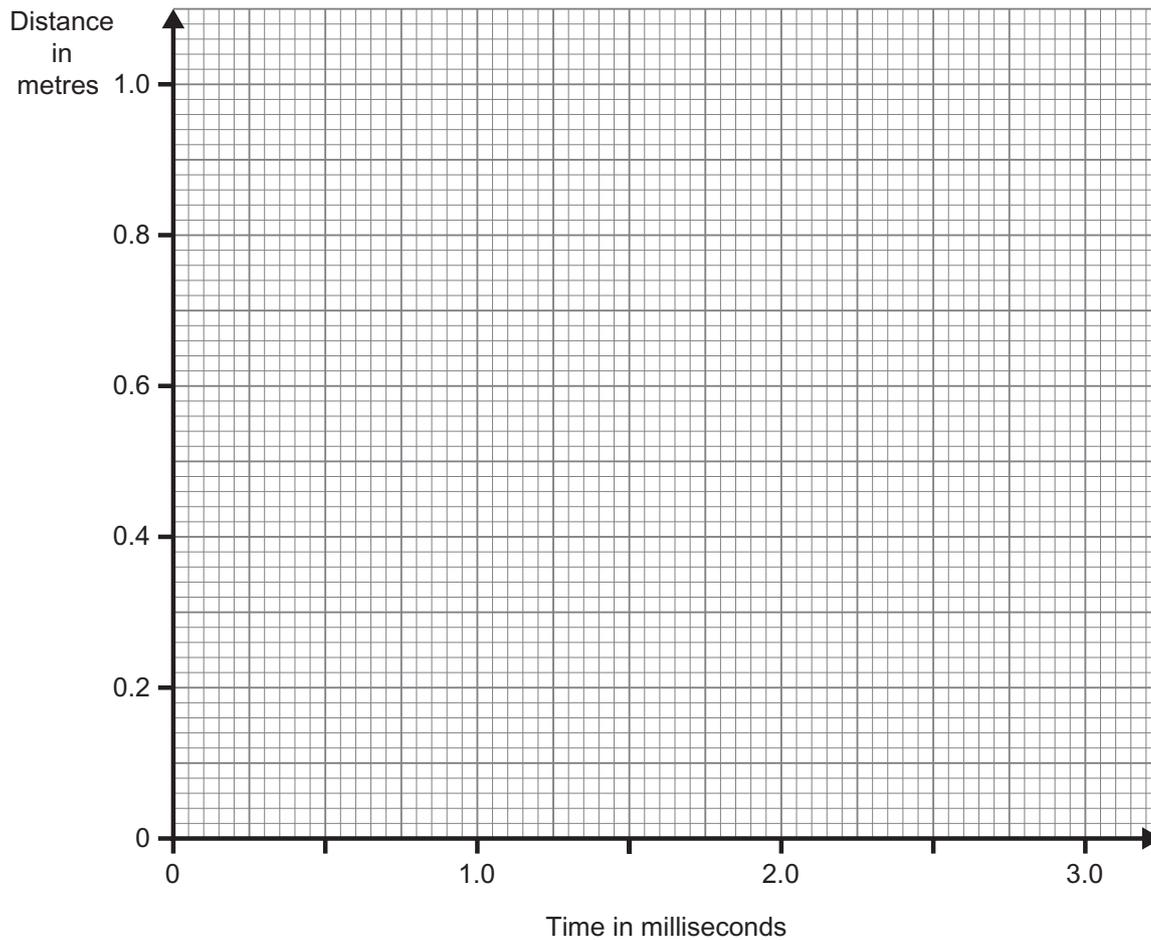
$$(1 \text{ ms} = 1 \text{ millisecond} = 0.001 \text{ s})$$

Speed of sound = _____ m/s [3]

Examiner Only	
Marks	Remark



(iii) Using the grid below plot a graph of distance d (y-axis) against time to travel the distance d (x-axis). Draw a line of best fit through the points. [3]



(iv) The sound emitter was placed at a distance from the object that gave a **round trip** time of 3.0 ms. Using the graph determine the distance d .

Distance d = _____ m [1]

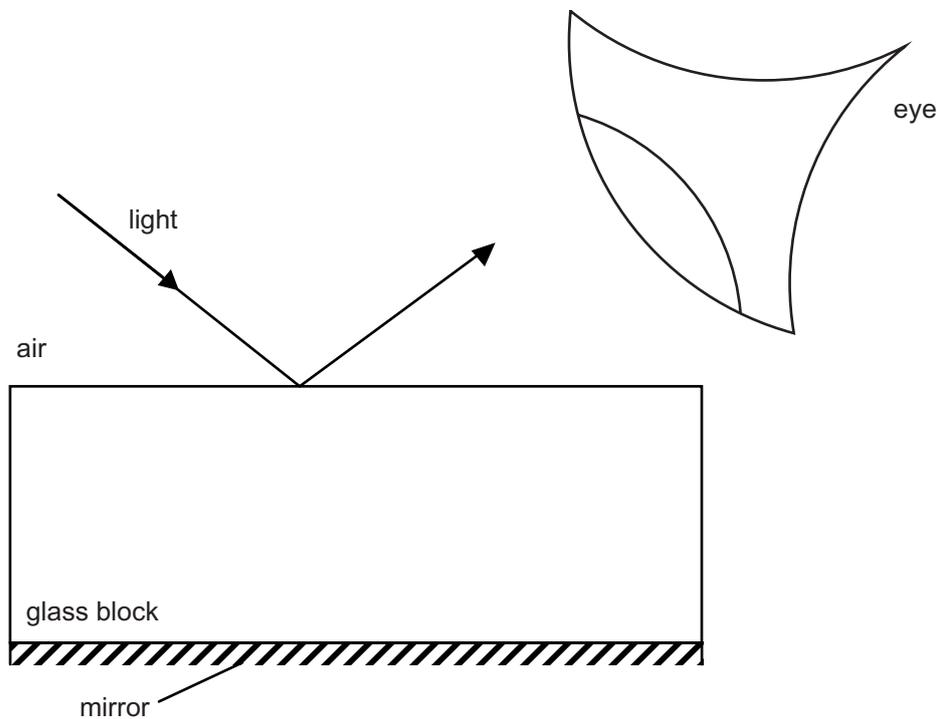
Examiner Only	
Marks	Remark
Total Question 1	

[Turn over



Examiner Only	
Marks	Remark

- 2 (a) The diagram shows a ray of light incident on a glass block. Some of the light is reflected at the top surface and some of the light passes through the glass and is reflected at the opposite side which has a mirrored surface.



- (i) Complete the path of the ray of light through the glass block and back out into the air towards the person viewing it as shown in the diagram. [3]

- (ii) Explain, in terms of the speed of light, why the ray of light takes the path you have drawn in the glass.

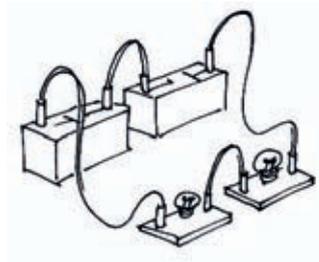
_____ [2]

- (iii) What is the relationship between the angle of incidence and the angle of reflection?

_____ [1]



- 3 (a) The diagram below shows two 1.5V cells connected to two lamps. The two lamps are lit.



- (i) In the space below draw the circuit diagram, using the standard symbols, for the circuit shown above.

[4]

- (ii) When the two lamps are lit the current flowing in the circuit is 0.2A. Each cell provides a voltage of 1.5V. Calculate the total resistance of the circuit. **You are advised to show clearly how you get your answer. Remember to give a unit with your answer.**

Resistance = _____ [4]

Examiner Only

Marks Remark



- (c) The photograph shows a girl touching an electrostatic generator. The generator gives the girl's hair a positive charge.



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- (i) Describe how her hair acquires a positive charge.

[1]

- (ii) When she touches an object a small spark is seen. What particles are moving in the spark and in what direction do they move?

1. The particles are _____

2. The direction in which they move is _____

[2]

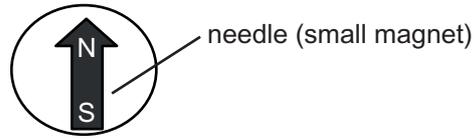
Examiner Only

Marks Remark

Total Question 3

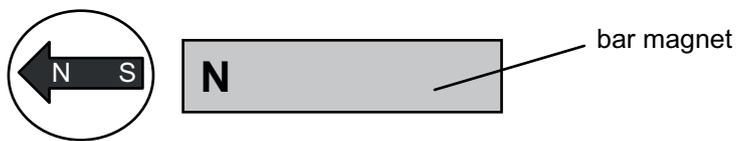


- 4 (a) The diagram below shows a plotting compass which consists of a needle (small magnet) pivoted so that it can move freely. When a magnet is not present it points in the direction shown.



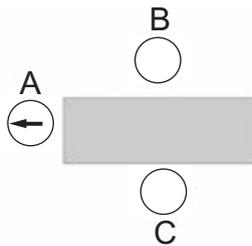
- (i) When the plotting compass is placed close to a bar magnet the needle of the plotting compass points in the direction shown below.

Explain why this happens.



[1]

In the diagram below, a plotting compass shows the direction of the magnetic field of the bar magnet at position A.



- (ii) Draw arrows in the circles to show the directions of the magnetic field at points B and C. [2]
- (iii) Mark with an S, on the diagram, the south pole of the magnet. [1]

Examiner Only

Marks Remark

[Turn over



5 (a) (i) Name the generally accepted scientific model which describes the formation of the Universe.

_____ [1]

(ii) According to this model how old is the Universe?

_____ years [1]

(iii) The light from distant galaxies is red shifted. What is meant by red-shift?

_____ [1]

(iv) What is the explanation of this red-shift?

_____ [1]

Examiner Only	
Marks	Remark



(ii) What does **Diagram B** suggest about the structure of the topmost layer of the Earth?

[1]

(iii) How does the structure of the Earth suggested by **Diagram B** explain **earthquakes**?

[3]

(iv) How are **volcanoes** explained by this structure of the Earth?

[3]

THIS IS THE END OF THE QUESTION PAPER

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Marks Remark

Total Question 6



DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	

Total Marks	
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Examiner Number

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