

Write your name here	
Surname	Other names
Centre Number	Candidate Number
Edexcel GCSE	
Physics/Science	
Unit P1: Universal Physics	
Foundation Tier	
Wednesday 9 November 2011 – 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.

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Turn over ►

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FORMULAE

You may find the following formulae useful

wave speed = frequency \times wavelength

$$v = f \times \lambda$$

wave speed = $\frac{\text{distance}}{\text{time}}$

$$v = \frac{x}{t}$$

electrical power = current \times potential difference

$$P = I \times V$$

cost of electricity = power \times time \times cost of 1 kilowatt-hour

power = $\frac{\text{energy used}}{\text{time taken}}$

$$P = \frac{E}{t}$$

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

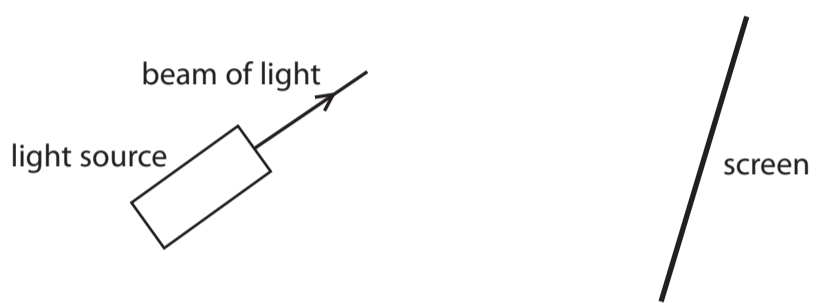


Answer ALL questions.

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 waves

- 1 (a) A student investigates the spectrum produced by visible light. The diagram shows some of the equipment she uses.

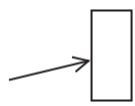


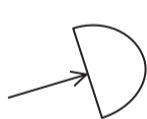


She uses a piece of glass to split up the light into its colours.

- (i) Which of the following would be the best shape to use?

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

(1)

- A 
- B 
- C 
- D 



(ii) Each colour has a different wavelength.
List the other colours in order of wavelength.
Three have been done for you.

(2)



(b) Electromagnetic waves have many uses.

Draw **one** straight line from each type of wave to show one use of the wave.

(3)

type of wave	use of wave
gamma rays ●	● checking money
infrared ●	● mobile phones
microwaves ●	● seeing broken bones
	● sterilising food
	● thermal imaging



(c) Both infrared and ultraviolet rays can have harmful effects on our bodies.

Describe how the harmful effects of these rays are different.

(2)

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(Total for Question 1 = 8 marks)



Earthquake waves

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

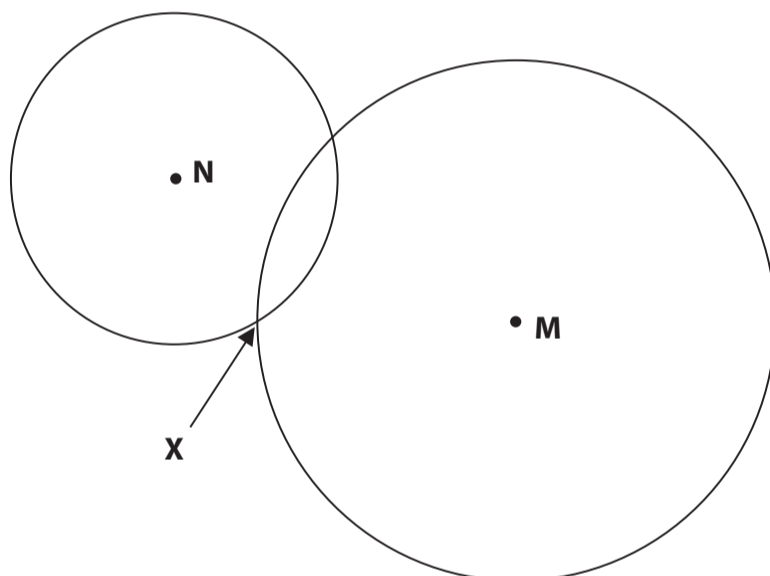
Earthquakes can produce infrasound waves.

Compared to normal sound waves, infrasound waves always have a **smaller**

(1)

- A amplitude
- B energy
- C frequency
- D wavelength

(b) The diagram shows circles drawn around two research stations, **M** and **N**.
 The stations are for detecting earthquakes.
 Each circle shows the distance of the earthquake from that station.



(i) Two students discuss the diagram.
 Student A said: the earthquake **must** have been at X.
 Student B said: the earthquake **might** have been at X.
 Explain why the statement from student B is better.

(2)

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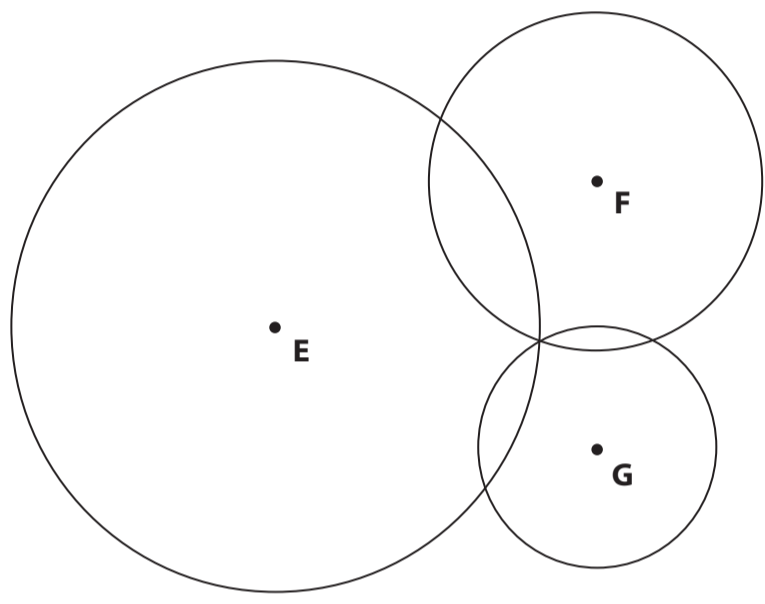
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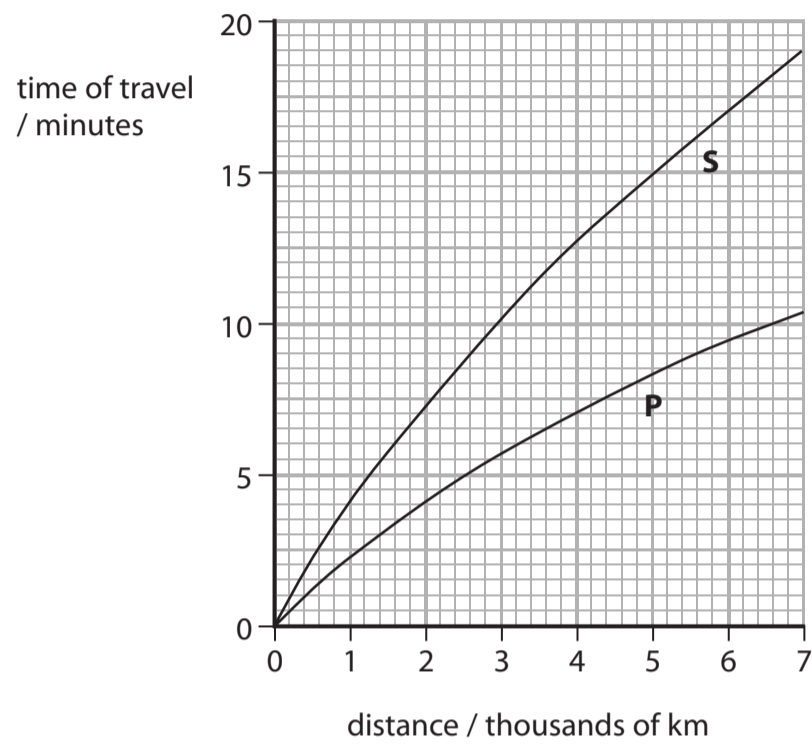
(ii) The diagram shows circles drawn round three research stations, **E**, **F** and **G**, for another earthquake.

Draw an arrow on the diagram to show where this earthquake probably happened.

(1)



(c) The graph shows information about P-waves and S-waves from an earthquake.



An earthquake station is 6000 km from an earthquake.
The P-wave reaches the earthquake station before the S-wave.

Use the graph to find the difference in the arrival time of the S-wave and P-wave.

(2)

difference in arrival time = minutes



(d) P-waves are longitudinal.

Describe how particles in the ground move when P-waves pass through it.

(2)

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(Total for Question 2 = 8 marks)



Exploring space

3 (a) The photograph shows an Apollo 12 astronaut walking on the Moon.



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

Manned space crafts have landed on the Moon but have not yet landed on Mars.

One of the reasons is because

(1)

- A** the Moon is closer to Earth than Mars
- B** the Moon is closer to the Sun than Mars
- C** Mars is closer to the Earth than the Moon
- D** Mars is closer to the Sun than the Moon

(b) A scientist compares the sizes of some objects in space.

Which of these is the smallest?

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

(1)

- A** Jupiter
- B** the Milky Way galaxy
- C** the Moon
- D** the Sun



(c) Some scientists look for signs of water on other planets.

Suggest why they do this.

(1)

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(d) The Earth is 150 000 000 km from the Sun.
It takes light 500 s to reach the Earth from the Sun.

Calculate the speed of light in km/s.

(3)

speed = km/s

(e) The photograph was taken using a powerful telescope on Earth.
It shows a nebula and many stars.



(i) Explain why photographs from telescopes in space show the nebula more clearly.

(2)

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(ii) A nebula is a cloud of gas and dust where stars are formed.
A hot object forms when gas and dust in a nebula come together.
Explain why the gas and dust come together and form a hot object.

(2)

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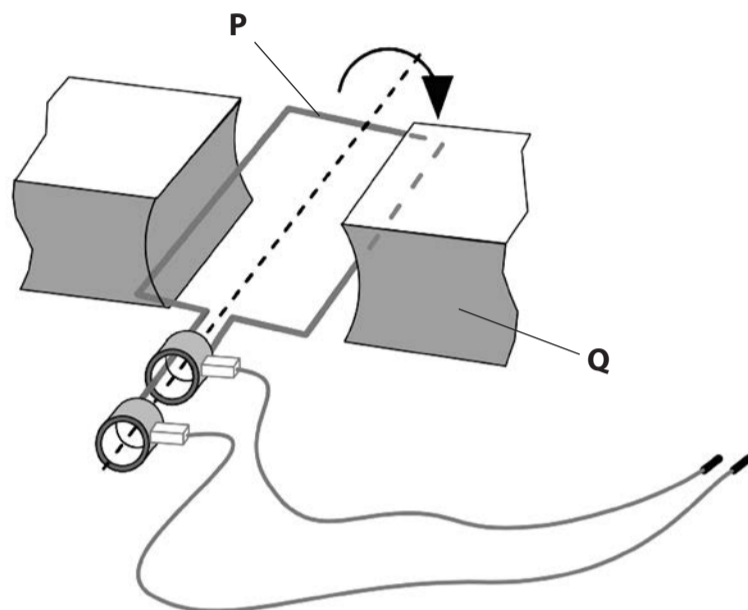
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(Total for Question 3 = 10 marks)



Alternating current and its uses

4 The diagram shows a generator producing an alternating voltage.



(a) Draw **one** straight line from each letter to its correct label.

(2)

letter

label

P	●
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●	slip ring
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●	coil
---	------

●	axle
---	------

Q	●
---	---

●	brush
---	-------

●	magnet
---	--------

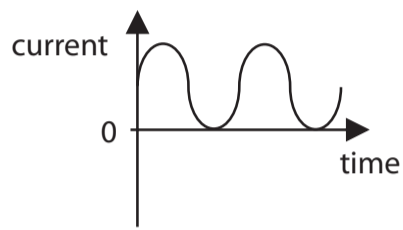


(b) The generator is connected to a lamp.
The current in the lamp is alternating.

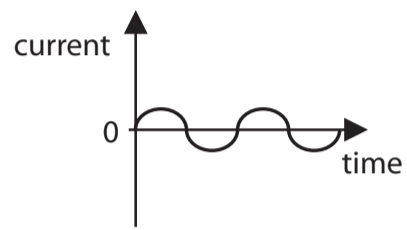
(i) Which of these is an alternating current?

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

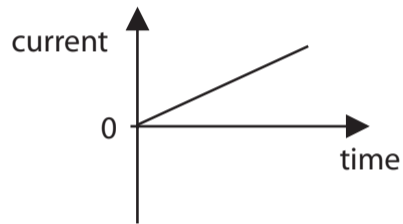
(1)



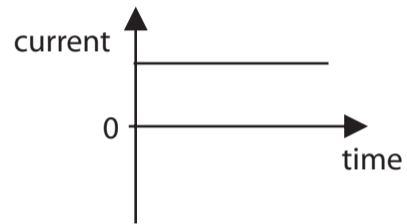
A



B



C



D

(ii) The generator is turned faster.

Explain what happens to the lamp.

(2)

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(c) A larger generator produces a current of 2 A at a voltage of 12 V.

Calculate the electrical power generated.
State the unit.

(3)

power generated = unit =



(d) Transformers are designed to use alternating current.

Describe what change happens when a step-up transformer is used.

(2)

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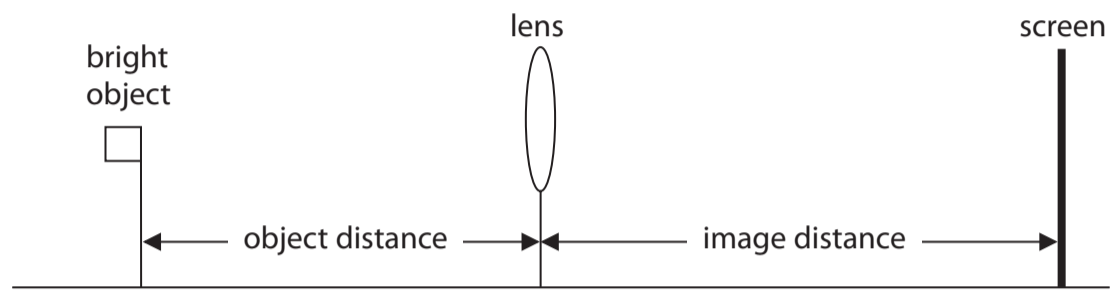
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(Total for Question 4 = 10 marks)



Optical instruments

5 (a) A student uses this apparatus to investigate a converging lens.



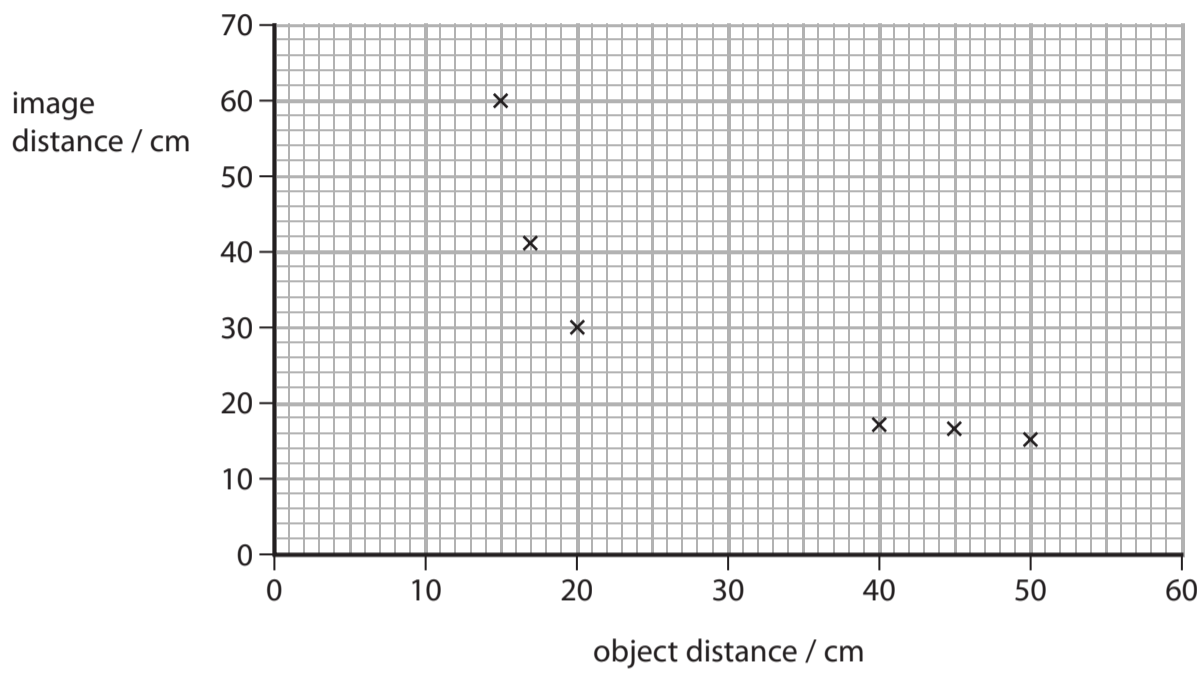
He sets the object distance at 15.0 cm.
He moves the screen until he can see a clear image and then he measures the image distance.
He repeats this for several other object distances.

The table shows his results.

object distance / cm	image distance / cm
15.0	60.0
17.0	40.8
20.0	30.0
30.0	20.0
40.0	17.1
45.0	16.4
50.0	15.8



He plots a graph of image distance against object distance.



- (i) Add to the graph the point for the object distance of 30.0 cm. (1)
- (ii) Draw the curve of best fit. (1)
- (iii) Describe how the image distance changes as the object distance changes. (2)

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- (iv) The focal length of this lens is 12 cm.
The student takes the lens and holds it 6 cm away from an object.
Describe the image the student sees when he looks through the lens. (2)

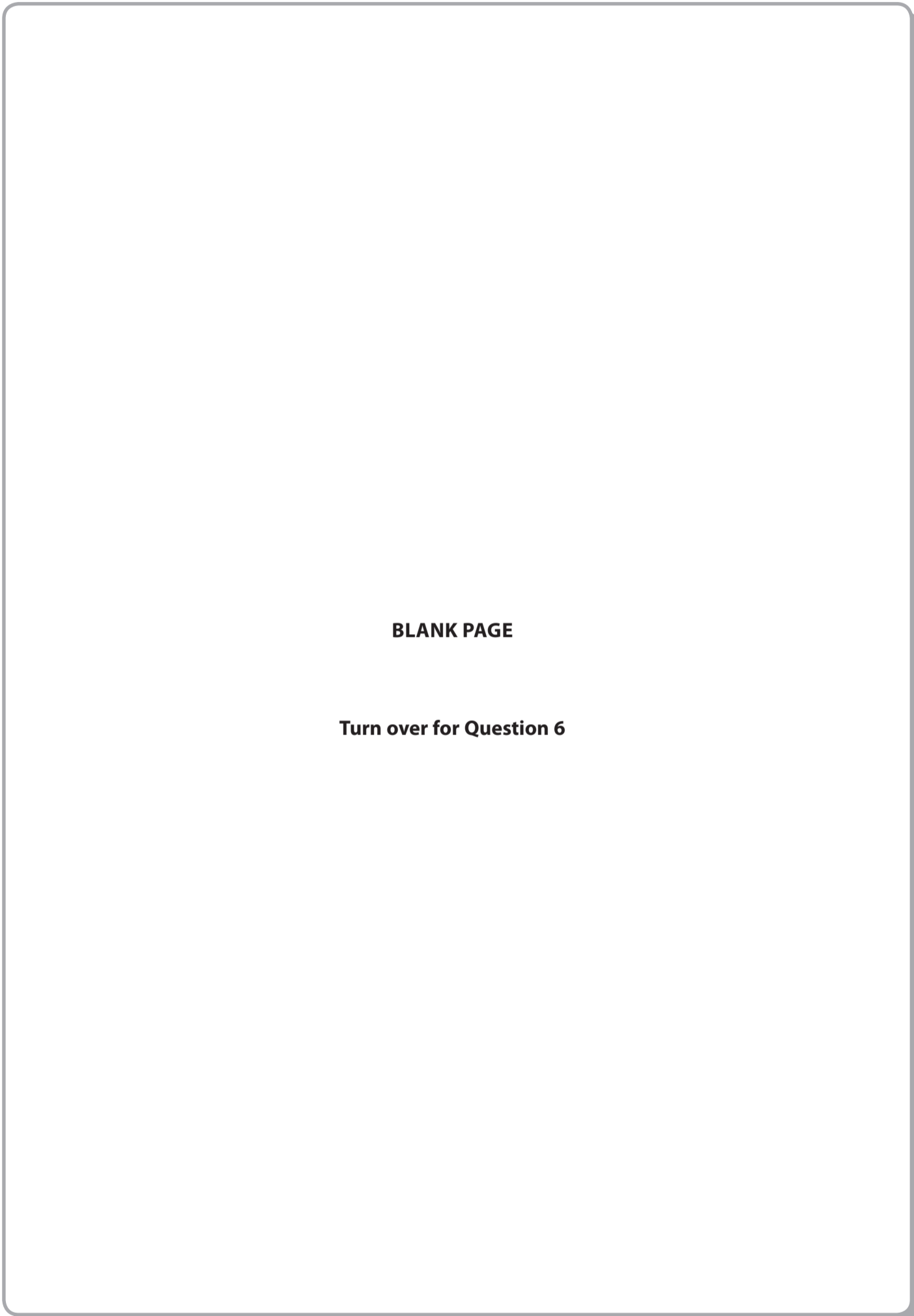
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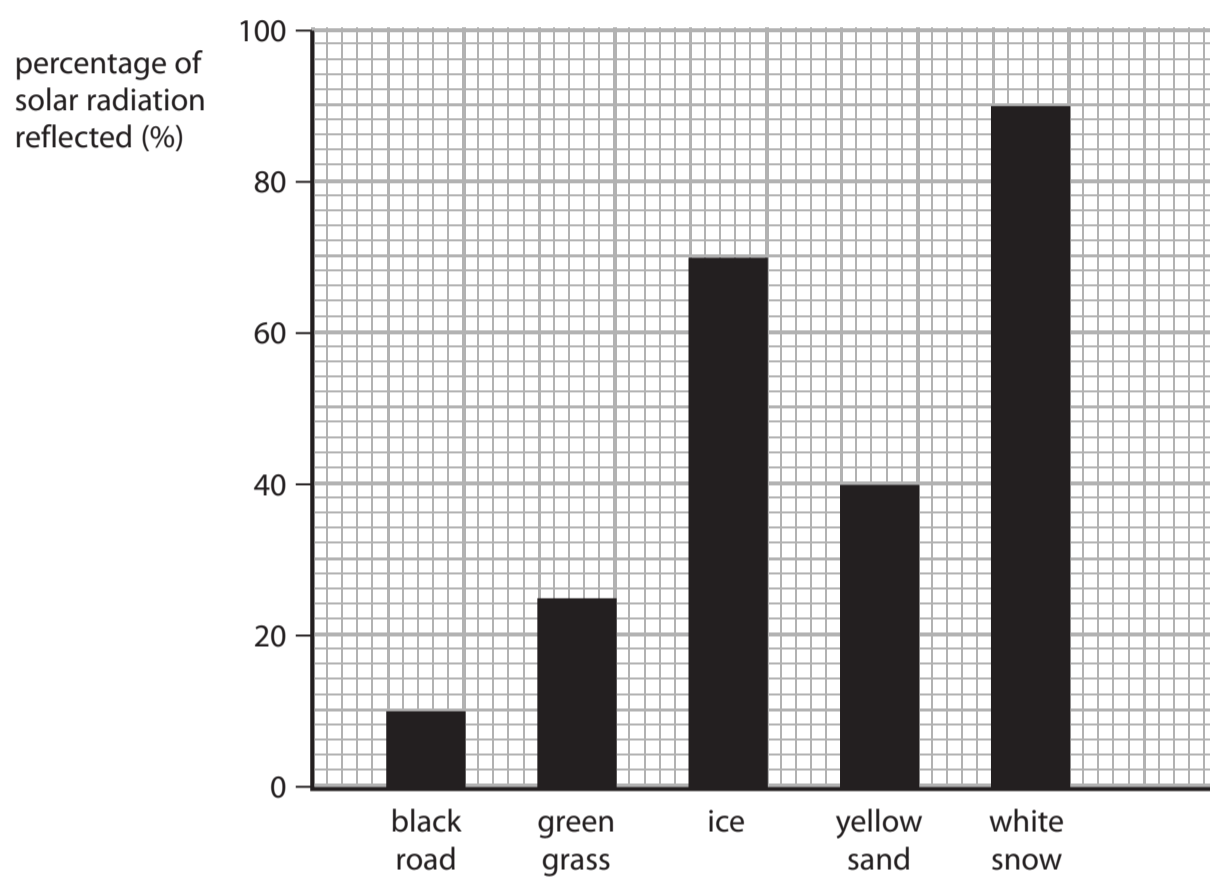


P 4 0 1 7 8 A 0 1 9 2 4

Solar radiation

6 Most of the energy we receive on Earth comes from the Sun.

The bar chart shows the percentages of solar radiation reflected by some materials.



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

A student used the bar chart to estimate the percentage of solar radiation **reflected** by a rough piece of coal.

The percentage is most likely to be about

(1)

- A 10%
- B 40%
- C 60%
- D 80%



(b) Radiation from the Sun which is not absorbed is reflected.
For water, the amount of solar radiation absorbed (taken in) is 94%.

(i) Calculate the percentage of solar radiation reflected by water. (1)

percentage of solar radiation reflected by water

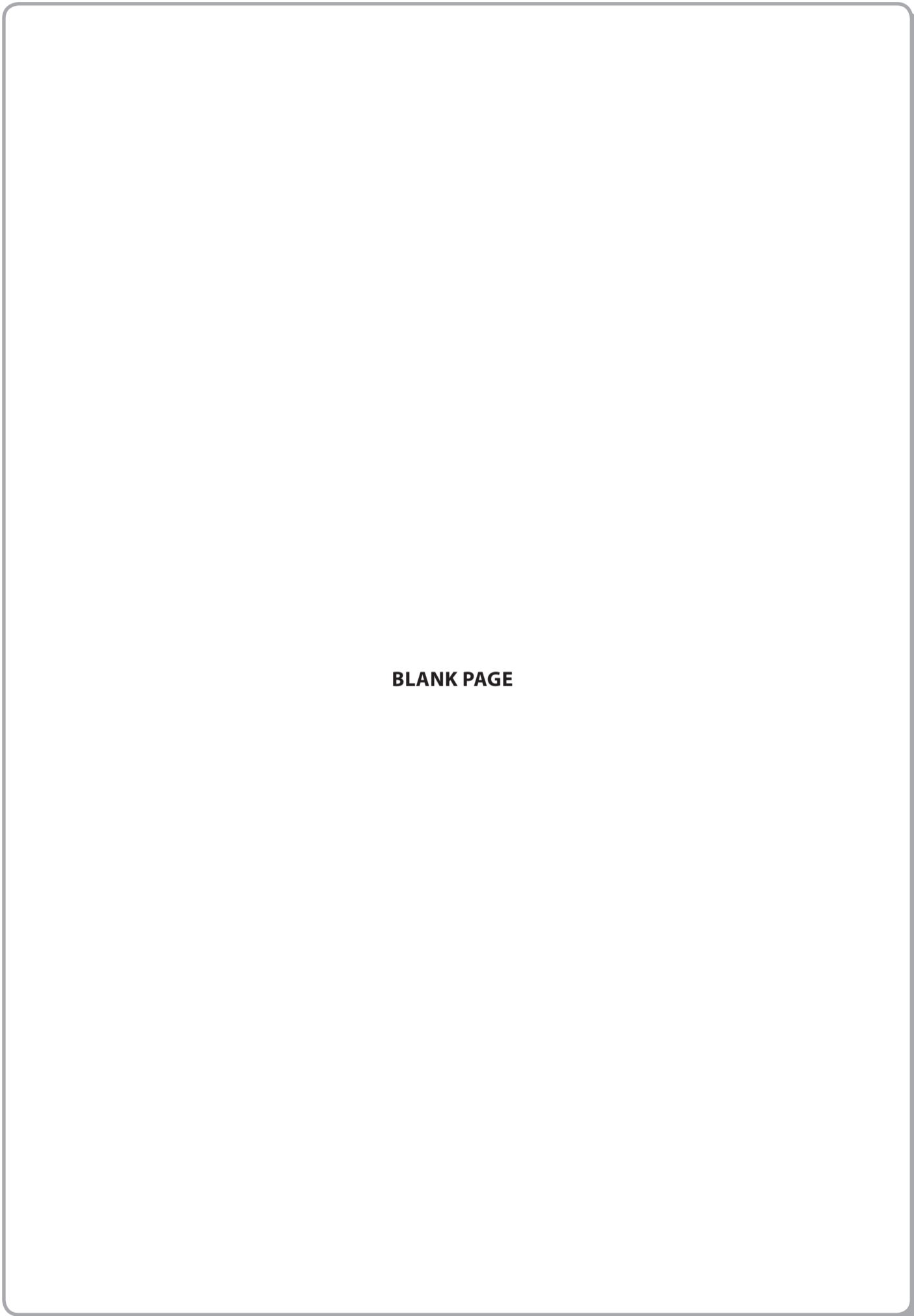
(ii) Use the graph to show how this information supports the idea that solid surfaces reflect better than liquid surfaces. (1)

(c) As Antarctic ice melts, its surface area decreases.
At the same time, the area of water surface increases.

(i) Explain what happens to the amount of radiation absorbed. (2)

(ii) State the effect that this change in the amount of radiation absorbed will have on the water. (1)





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P 4 0 1 7 8 A 0 2 3 2 4





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P 4 0 1 7 8 A 0 2 4 2 4